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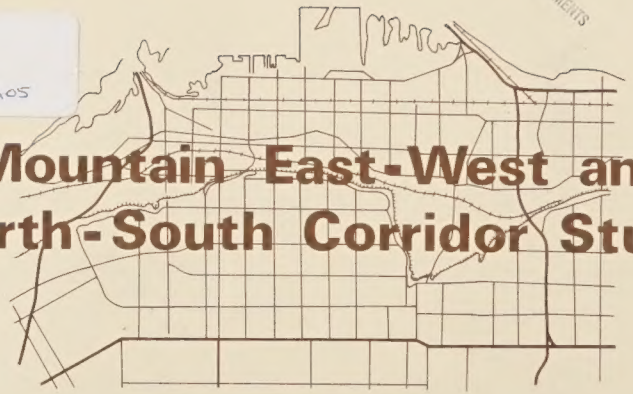

Mountain East-West and North-South Corridor Study

PHASE 4 · Functional Planning of Preferred Option

Report 4 of 4

September, 1981

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1. Introduction and Summary

1. INTRODUCTION AND SUMMARY

This report outlines the findings and recommendations of the Mountain East - West and North - South Corridor Study - Phase 4.

1.1 FUTURE ROAD NEEDS - PHASE 1

Phase 1 of the project established the need, scope, and timing of a new roadway link between Highway 403 and the Queen Elizabeth Way in the eastern part of Hamilton and/or Stoney Creek. The basis of this finding was developed from projections of travel demand within the Region given the 2001 population and employment projections outlined in the Hamilton-Wentworth Region Official Plan. The procedures and findings of Phase 1 of the study are documented in the report prepared July, 1978.

1.2 PRELIMINARY EVALUATION OF ALTERNATIVES - PHASE 2

Phase 2 of the project involved an initial evaluation of all feasible alternatives which were identified by the study participants and by public comment. These alternatives represented various combinations of locational and facility options.

As a result of the Phase 2 screening procedures, six alternatives were selected for further refinement and detailed evaluation in Phase 3. The procedures and findings from the Phase 2 component of the project are described in detail in the report prepared January, 1979.

1.3 DETAILED IMPACT ASSESSMENT AND EVALUATION - PHASE 3

Phase 3 focused on the detailed examination and evaluation of the six alternatives selected in Phase 2. A preferred alternative was recommended for detailed analysis in Phase 4. The procedures and findings of Phase 3 of the study are documented in the report prepared August, 1979.

1.4 SCOPE OF THE ASSIGNMENT - PHASE 4

In Phase 4, the functional planning for the preferred alternative was completed. The scope of the work included the following:

(i) The refinement of the traffic assignments to account for interim changes in the adopted development proposals of the Regional Official Plan, and the adjustments in the roadway network due to the results of the functional planning analysis.

(ii) The preparation of plan and profile drawings at a scale of 1:2000 on current base mapping. Sufficient detail was provided to identify right-of-way acquisition and to form a basis for future detailed design.

(iii) The completion of detailed investigations to indicate measures to reinforce the positive effects of implementation and to reduce the negative effects on the social/cultural and natural environments.

These investigations included an extensive noise impact analysis, the preparation of a possible recreational master plan for the Red Hill Creek Valley, and a detailed natural environmental impact analysis.

(iv) The continuation of the public involvement program started in the initial phase of the project to allow organized interest groups and individual members of the public to be informed of the proposals and to comment on the details of the recommendations.

(v) The preparation of a recommended staging program considering the travel demand and the financial capabil-

ities of the affected municipalities and agencies.

(vi) The preparation of an Environmental Assessment Report - Type I* to satisfy the requirements of the Environmental Assessment Act.

**The Environmental Assessment Report - Type I represents the first of a two-part environmental assessment carried out for a Group A project. It documents the planning phase of a process which terminates with the design of the project. It includes a discussion of the purpose of the planning study, the study approach, the existing conditions in the study area, the planning alternatives considered, the selected planning alternative with associated environmental concerns and matters requiring further study during the design stage. The Environmental Assessment Report - Type I will be followed, at some subsequent date, by one or more Environmental Assessment Reports - Type II, which will document the design and construction phases of project implementation.*

1.5 REPORT FORMAT AND CONTENT

The remainder of this section of the report highlights the findings and recommendations derived from the Phase 4 analysis. Section 2 summarizes the scope and findings of the environmental and engineering investigations carried out in the refinement of the preferred alternative. The details of the recommended plan are given in Section 3. The report concludes with a description of the public involvement program. A list of the interim reports submitted during the course of the project is given in Appendix A.

The Proposal for a Recreation Master Plan for the Red Hill Creek Valley was submitted as a separate document. The findings and recommendations have been included in this report. The Environmental Assessment Report - Type I was developed in a separate submission. The data analysis, findings, and recommendations contained in this report were incorporated in the environmental assessment document.

1.6 SUMMARY OF FINDINGS - PHASE 4

During the impact assessment analysis and the public review of the assignment, several issues and concerns were expressed regarding the future implementation of the preferred alternative. The intent of the investigations carried out in Phase 4 focused on the impacts of construction on a local scale, and addressed the pertinent issues raised by the public.

Under the selected proposal, a controlled access roadway extends from the Queen Elizabeth Way at a new interchange and remains within and follows the Red Hill Creek Valley to a point just north of Greenhill Avenue. At this point, the roadway ascends from the Valley following the general alignment of Mount Albion Road to connect with an east - west roadway in the vicinity of Mud Street and Pritchard Road.

In the east - west corridor, an at-grade arterial roadway extends from the proposed Mud Street interchange through to the existing Mohawk Road interchange at Highway 403. The east - west roadway generally follows the 200-foot vacant corridor positioned immediately south of Limeridge Road.

The recommended plan, illustrated in Exhibit 1, was chosen after examining several alignment and interchange configurations. The details of the selected plan are given in Exhibits 5 to 28.

The findings and recommendations of the investigation follow. Further information to support these conclusions is given in the remainder of the report.

The Recommended Roadway

In the east - west corridor, a four-lane, limited access arterial, with

intersections at-grade with the major north - south roadways will be sufficient to accommodate the projected traffic volumes between Glancaster Road and Upper Gage Avenue. At the west limits, the section between Glancaster Road and Highway 403 will require complete control of access. All construction will be contained within the protected 61 m corridor.

East of Upper Gage Avenue, a six-lane arterial is required to provide a smooth transition section between the Mountain East - West Arterial and the North - South Parkway.

At-grade intersections will be provided at the following streets:

- Glancaster Road
- Upper Paradise Road
- Garth Street
- Upper James Street
- Upper Wellington Street
- Upper Wentworth Street
- Upper Sherman Avenue
- Upper Gage Avenue
- Upper Ottawa Street

In the north - south segment, a six-lane controlled access roadway will be required to accommodate the traffic volumes from Dartnall Road to Barton Street. North of Barton Street to the Queen Elizabeth Way, a four-lane freeway section is proposed. A basic 90 m right-of-way will be required, with additional property required at interchange locations and areas of large cuts and fills. North of Mud Street, the Parkway is located almost entirely on property owned by the City or Region, and very little would be required from the private owner.

Interchanges are planned at the following locations:

- Dartnall Road
- Mud Street/Trinity Church Road
- Greenhill Avenue
- King Street
- Queenston Road
- Barton Street

Grade separations are included at the following locations:

- Arbour Road/Pritchard Road
- Agate Street
- Mount Albion Road Park Access
- Brampton Street
- CNR, Hagersville
- T.H.& B. Railway
- CNR Mainline

Extensive investigations related to utility relocation, soils, drainage, and roadway functional planning confirmed the feasibility of constructing the above-described facility using conventional roadway construction techniques.

Social Impacts

The impact on the residents living near or adjacent to the proposed roadway facility will be minimal or limited.

The selected location follows currently established community boundaries. The proposed roadway was incorporated as a principal planning feature in the structuring of the neighbourhoods in the Mountain area. In the north - south corridor, the roadway is contained principally within public open space and, therefore, the form of adjacent residential areas is not altered.

Accessibility to local and neighbourhood facilities is not altered. In general, full access to the proposed facility and to the existing collector and arterial street system is maintained. The change in local traffic circulation patterns is minimal. Being located along neighbourhood boundaries, the effect on pedestrian movements to local educational, religious, and recreational facilities is not adverse.

Given the scale of the roadway project, the displacement of people through residential property acquisition is relatively small. In the east - west corridor, approximately 50 homes would be required for the initial construction. In the north - south corridor, 4 homes will be displaced due to the proposed roadway construction. The impact of displacement will be

greatly reduced due to the provision of equitable property cost settlements, the availability of replacement housing being high, and the extended time for relocation available. Under the proposed staging, construction of the roadway is not anticipated for approximately 5 to 10 years.

No change in air quality in the adjacent residential neighbourhoods is projected. A detailed analysis suggests the magnitude of the change is small and, further, it is restricted within the roadway right-of-way.

An in-depth noise impact analysis confirmed the planned acoustical barriers incorporated in the construction will be capable of maintaining noise levels within acceptable limits. The 24-hour ambient noise levels within the adjacent residential neighbourhoods will not exceed 60 dBA under the proposal. This noise level is consistent with the ambient noise level in a fully developed urbanized area.

The archaeological and historic sites investigation indicates the proposed corridors have been extensively disturbed by past development and cultivation. No sites of scientific or educational value exist along the route. Of the limited number of historic structures identified, preservation through relocation is possible if deemed warranted.

The construction of the proposed roadway within the Red Hill Creek Valley will have a minor impact on existing recreational facilities. The recreational master planning analysis indicates that the full potential of the King's Forest Park area for active and passive recreation can be achieved. North of the T.H.& B. Railway crossing, the use of the Valley would be restricted to pedestrian linkages similar to its present use. Accordingly, the impact of the proposed roadway construction on the recreational resource is considered moderate.

In all segments of the proposed roadway corridors, the natural scenic resource has been disturbed to a greater or lesser degree by the present and past surrounding urban development. In the area of the Upper Red Hill Creek Valley, the impact of the roadway construction on the urban scenic resource of the Niagara Escarpment is significant. Mitigation of the impact has been provided by:

- restriction of the roadway to the east side of the Valley adjacent to the H.E.P.C. tower transmission line and the existing Mount Albion Road crossing of the Niagara Escarpment;
- provision of earth berms and vegetation buffers; and
- maintenance of current pedestrian access from the residential areas to the Valley.

In other sections of the roadway alignment, the impact of the roadway construction on scenic resources is considered moderate.

Economic Impacts

The economic impact of a transportation facility is measured by changes in employment, property values, income, and business activity. Direct economic impact includes displacement as well as the generation of jobs and income through the purchase of goods and services to construct the roadway. Indirect economic effects include induced changes in growth, accessibility to markets, and possible effects on adjacent property values.

The magnitude of direct economic impact is nil since no existing business is affected. No detrimental indirect effect on local business is forecast as neighbourhood accessibility is maintained and diversion of traffic is not foreseen as a major impact as through traffic volumes on the facility represent less than 10 percent of the total. Consequently, the effect on highway commercial business is expected to be minimal.

In general, the construction of the roadway is viewed as a positive factor in achieving the planned growth of the employment and residential areas within the Region. The proposed facility will upgrade the current level of

accessibility under a planned growth to 550,000 population. The no-action alternative is not adequate to maintain the present level of accessibility given the projected growth. The analysis suggests the current low level of accessibility is a contributing factor to the slow development of the residential and industrial lands south of the Escarpment.

The efficient movement of goods and services is being affected by the current lack of attractive transportation routes. This results in a decline of the competitive advantage of the established and planned industrial and commercial developments within the Region.

Estimating property value changes and induced-growth effects is difficult. Where property values have increased, improved accessibility has been cited as the primary reason. Losses in property values are most frequently attributed to decreases in accessibility and increases in noise and air pollution. Based on the above, property values adjacent to the facility will not be adversely affected. Current accessibility levels have been maintained or improved while the analyses of air quality and noise levels suggest current conditions can be maintained or kept within the perceived acceptable standards within an urban environment.

There is a tendency to view the no-action alternative as a no-impact case when, in fact, there are definite fiscal impacts that may be avoided by the proposed transportation facility. These effects relate directly to the diversion of through auto and truck volumes from adjacent streets with abutting residential development. The air and noise pollution from this traffic can depress residential property values and commercial activity. The right-of-way provided under the proposed roadway is sufficient to develop noise and visual protection of the abutting residential areas. Under the no-action alternative, little or no protection can be offered because the existing roadway rights-of-way and the access requirements do not provide an opportunity to protect the abutting properties from the noise and visual intrusion.

The proposed facility does not support the continued current rate of use of the automobile, but recognizes an optimum balance in the use of the public and private transportation modes. The projected vehicle demands generated by the planned growth reflect the impact of a number of energy conservation techniques, and the provision of an improved and expanded public transit system.

The energy required to operate the volume of traffic under the proposed roadway will be less than the no-action alternative. As a result, the construction of the proposed roadway is a positive approach to reducing energy consumption. The significant reductions in fuel consumption will result in substantial cost savings to motorists.

Natural Environment

Based on the extensive analysis carried out in Phase 3, adjustments in the roadway alignment were carried out to minimize the disturbance of the terrestrial and aquatic ecosystems. These adjustments principally involved avoidance of major woodlots or their significant fragmentation.

Fourteen areas of concern relative to the natural environment were identified at the microscale. As a result of the interactive process, five of the features have been completely avoided. Of the remaining areas, the impact on all but two of the features is considered moderate and capable of successful mitigation.

At the Upper Ottawa Street Landfill Site, the roadway alignment will cause fragmentation of the existing woodlot. A minor stream diversion is planned for the Red Hill Creek in this location. As the wildlife is principally avian and urban-tolerant, the impact of the roadway construction is considered moderate.

The impact on the Red Hill Creek Marsh will be severe and difficult to

mitigate. In assessing the significance, the impact must be viewed in relation to the existence and planned expansion of the Queen Elizabeth Way between Burlington Street and Highway 20. The Marsh area is presently highly disturbed as a result of being adjacent to the Queen Elizabeth Way and the past construction of the H.E.P.C. transmission towers and the CNR spur line to Lang's Foods.

Construction

The staging program must recognize the traffic priorities, construction sequence requirements, and the financial capabilities of the funding agencies. Based on the above, a suggested staging is described below and illustrated in Exhibit 29.

Stage 1 - Upper Gage Avenue to King Street

The initial facility will be a four-lane rural freeway section to connect the arterial road network above the Escarpment to the street system located below.

Stage 2 - King Street to the Queen Elizabeth Way

A four-lane rural freeway section will be constructed from King Street to the Queen Elizabeth Way. The construction cost estimates included extend to the north property limits of Brampton Street. The roadway and interchange construction north of Brampton Street is the responsibility of the Ministry of Transportation and Communications.

Stage 3 - Upper Gage Avenue to Highway 403

A four-lane urban arterial will be provided between Upper Gage Avenue and Highway 403, and will be phased in keeping with the financial capability of the funding agencies. The completed segments will be terminated at the major north - south arterials.

The cost estimates, including property acquisition, for the individual stages are summarized below based on 1980 unit prices:

Stage 1	- $ 46,826,000
Stage 2	- $ 22,105,000
Stage 3	- $ 21,250,000
Subsequent phases of total construction	- $ 11,685,000
Total	$101,866,000

2. Refinement of Preferred Alternative

2. REFINEMENT OF PREFERRED ALTERNATIVE

This section of the report [illegible] as a basis for the refinement of t[illegible] uation of Phase 3. The intent of these investigations was:

- [illegible]
- *to define in greater detail the construc[illegible] implications, and right-of-way requirements.*

2.1 INTRODUCTION

As a result of the in-depth assessment of the viable alternatives, the Study Team recommended Alternative 2 be selected for detailing in Phase 4. This alternative will be the least disruptive to the community while providing the best opportunity to achieve the desirable objectives for growth and development in the Region.

Under Alternative 2, a freeway extends from the Queen Elizabeth Way at a new interchange and remains within and follows the Red Hill Creek Valley to a point just north of Greenhill Avenue. At this point, the roadway ascends from the Valley following the general alignment of existing Mount Albion Road to connect with the east - west roadway in the vicinity of Mud Street and Pritchard Road. Throughout the north - south segment, access would be controlled through interchanges at Barton Street, Queenston Road, King Street, Greenhill Avenue, Mud Street, and Dartnall Road. All other road and rail crossings would be grade-separated.

In the east - west direction, an at-grade arterial roadway extends from the Mud Street interchange through to the existing Mohawk Road interchange at Highway 403. The east - west facility generally follows the 200-foot vacant corridor positioned immediately south of existing Limeridge Road.

The Study Team further recommended that property be protected adjacent to the east - west alignment to allow eventual upgrading of the east - west arterial roadway to a future freeway. In this way, the disruption to adjacent development could be minimized as a result of additional roadway construction when additional roadway capacity is needed.

During the impact assessment analysis and the public review, several issues and concerns were expressed regarding the future implementation of this preferred facility. It was recognized opportunities existed to reinforce the positive benefits of implementation and to mitigate against some of the undesirable effects of construction. The remainder of this section of the report highlights the findings of the additional investigations carried out to specifically address these issues. Particular areas where the preliminary plan developed in Phase 3 has been modified are identified.

2.2 ENVIRONMENTAL STUDIES

Phase 3 of the project highlighted the relative impacts of implementation of the viable alternatives on a corridor scale. The intent of the investigations carried out in Phase 4 focused on the impacts of construction on a local scale, and addressed the pertinent issues raised by the public.

The impact categories investigated include the following:

- community cohesion;
- accessibility of the facilities and services;
- displacement of people;
- effects on local business;
- residential activity;
- fiscal effects;
- regional and community plans;
- resources and energy;
- scenic resources, recreational resources, and historic values;

- effects on natural environment;
- air quality; and
- noise pollution.

In the discussion of each category, the magnitude, incidence, and significance of the effect is related to the no-action alternative where possible. The data presented represents the results of the more detailed investigations carried out in Phase 4 and information assembled in previous phases of the project.

Community Cohesion

Community cohesion refers to the way in which residents perceive their area or neighbourhood. The effect of roadway construction usually results in the displacement of people, the creation of a barrier effect between community residents or more subtle effects such as changes in the physical space or the form of the area. The impact may also be positive by creating a boundary which assists in more sharply defining an area or neighbourhood.

No single method is available to confidently measure impacts on community cohesion. Therefore, the assessment relies on judgment supplemented by data generated by past and current land-use planning, and public comment.

The magnitude of the impact of the selected facility construction on community cohesion is minimal. The selected location for the facility follows current established community boundaries.

In the east - west direction, the roadway has been proposed with a designated and generally vacant corridor. The corridor was established in 1968 under O.P.A. #228 and was incorporated as a principal planning feature of the road pattern and in the structuring of the neighbourhoods in this area. Since 1968, neighbourhood planning and development of these neighbourhoods has proceeded on the basis that a major roadway would be built along this protected corridor.

In comparison to the no-action alternative, the construction of the east - west facility yields a positive impact by allowing the planned downgrading, and incorporation of existing Limeridge Road into the local street system. The community cohesion north of the protected right-of-way will be improved.

In the north - south segment of the facility, the roadway is contained primarily within public open space. The form of the adjacent residential areas is not altered.

In comparison to the no-action alternative, the impact is considered positive through the significant reduction of the through traffic volumes along Mount Albion Road in particular, and to a lesser degree along Parkdale Avenue, Woodward Avenue, and Nash Road. The reduction of traffic volumes along these roadways which provide direct access to abutting residential development will have a positive influence in improving the community cohesion of the abutting neighbourhoods.

Accessibility of Facilities and Services

Ease of access to and from facilities and services affects the quality of neighbourhood life. The impact is caused by changes in travel patterns and/or changes in the supply of community facilities and services.

Full access is provided to the proposed facility from all major roadways in the arterial grid system. The exceptions to the above include:

(i) Mohawk Road - Golf Links Road

The intent of this configuration is to ensure the major east - west volumes of through and inter-urban traffic between residential, commercial, and industrial zones is shifted from Mohawk Road to the proposed Mountain East - West Arterial. The reduction of traffic volumes along Mohawk Road will improve the living amenity for the adjacent residential development.

The disruption of local traffic patterns is minimal as access is provided to the north - south arterial grid system from all residential zones.

(ii) West Fifth Street

The provision of an at-grade intersection between West Fifth Street and the proposed Mountain East - West Arterial would not allow desirable traffic signal progression along the facility. The grade separation was introduced to reduce traffic delay and vehicle operating costs in addition to minimizing the potential accident rate.

(iii) Arbour Road/Pritchard Road

Local access to the existing facilities and residential development in this area will not be significantly affected. A high level of access will be maintained through the substitution of the Trinity Church Road Extension and through adjacent interchanges at Dartnall Road and Mud Street.

The realignment of Mud Street is based on the development plan for the Saltfleet Community. As such, the proposed roadway alignment is compatible with the Saltfleet Community development.

(iv) Mount Albion Road

Under the proposed plan, Mount Albion Road will be downgraded to a local street within the Red Hill neighbourhood. However, this will not adversely affect access to this area. Travel to the north and south of the area will be directly accommodated through the interchange provided at Greenhill Avenue. The present connection of Mount Albion Road to King Street has been replaced by the extension of Pottruff Road south to Hixon Road. In addition, as further development takes place, access to King Street East will be further improved with the easterly extension of Greenhill Avenue.

Three other closures of existing roadways are also included under the proposal, namely:

1. Melvin Avenue at Neil Avenue
2. Pottruff Road at Barton Street
3. Pritchard Road adjacent to the proposed facility

The current Melvin Avenue crossing of the Red Hill Creek Valley cannot be maintained due to the Barton Street interchange construction with the proposed north - south roadway. No reduction of accessibility will result from this closure.

The Pottruff Road connection to Barton Street cannot be maintained due to the construction of the Barton Street interchange with the proposed north - south roadway. The number of residents inconvenienced by this closure totals 14 households. The average increase in travel distance for these residents is approximately 0.70 kilometres.

Pritchard Road is a local, rural-type road with households having direct access. While the road closure will create greater travel distances, the increase will not be significant.

In general, the accessibility of the residential neighbourhoods adjacent to the facility will be significantly improved to the major existing employment area along Burlington Street, to the large commercial centre under construction abutting the proposed facility at Upper Wentworth Street, to the Mountain Industrial Park under development in the vicinity of Dartnall Road, and to the industrial development along the Queen Elizabeth Way in Stoney Creek.

The increased accessibility to the Saltfleet Community will improve its attractiveness for continued development to its ultimate potential.

Accessibility to local neighbourhood educational, religious, and recreational facilities will not be adversely affected due to the location of the roadway adjacent to established neighbourhood boundaries throughout its length.

Changes in local pedestrian and vehicular traffic patterns are minimal. The facility is located along existing barriers to movement, specifically established rights-of-way in the east - west direction, and the Red Hill Creek Valley in the north - south direction.

The provision of properly located pedestrian crossings of the Red Hill Creek Valley was a major objective of the Recreation Master Plan Development. The proposed plan ensures the protection of a portion of the present pedestrian routes and affords additional opportunities through the provision of pedestrian walkways throughout the length of the Red Hill Creek Valley. The roadway construction will limit pedestrian access within the Valley by virtue of the physical construction of the roadway.

Accessibility to public transit will not be altered. The required routing revisions are minor and it was confirmed that the same level of service can be maintained. Further, the planned expansion of the bus routes is not affected by the proposed roadway construction.

At a Regional scale, the proposed facility will upgrade the current level of accessibility under a planned growth to 550,000 population. The no-action alternative is not adequate to maintain the present level of accessibility given the projected growth. The analysis suggests the current low level of accessibility within the urban area is a contributing factor to the slow development of the residential and industrial lands south of the Escarpment.

The efficient movement of goods and services is being affected by the current lack of attractive transportation routes. This results in a decline of the competitive advantage of the established and planned industrial and commercial developments within the Region.

2.2.3 Displacement of People

Displacement has three aspects:

- the number of families displaced;
- the probability that equivalent housing can be found for those affected; and
- the psychological impact of the relocation process.

A detailed survey was carried out to compile data on the potential properties affected by right-of-way acquisition. A total of 66 residential properties are required. No business enterprise is affected by the proposed roadway construction.

The majority residential property acquisition is restricted to the designated east - west corridor. Four homes are required in the north - south corridor at the Queenston Road interchange. A breakdown of the total right-of-way acquisition is tabulated below.

Ownership[1]

Private Property	
- occupied	65.2 Ac. (66 homes)
- vacant	67.9 Ac.
Public Lands	
- City owned	245.5 Ac.
- Region owned	22.4 Ac.
- Hamilton Region Conservation Authority	19.7 Ac.
- Ontario Housing Corporation	84.7 Ac.
- Railways, Utilities	17.8 Ac.
- Board of Education	0.2 Ac.
Total	523.4 Ac.

The probability of replacement housing being found is good. This conclusion

[1]As of 81-09-01

is based on the magnitude of the families to be relocated in comparison with the number of existing and planned housing units within the immediate area. The Region will make equitable property cost settlements. This will reduce the potential difficulty in obtaining equivalent housing.

In particular, a major concern of most of the affected property owners are the continued zoning restrictions on their properties. These restrictions have been in place for over 10 years as a result of the designation of the right-of-way for the proposed roadway adopted under O.P.A. #228. The property owners cannot carry out major improvements and apparently are having difficulty in disposing of their property. Recently, to overcome this difficulty, the Region, with the consent of the Ministry of the Environment, has purchased property in demonstrated hardship cases.

An additional aspect is the time available for relocation. Under the proposed staging, construction of the roadway in the east - west corridor is not anticipated for approximately 5 to 10 years. As a result, the impact of relocation is significantly reduced as the extended period provides considerable flexibility in the timing of actual relocation. Of the 62 homes to be acquired for the ultimate development of the east - west roadway, 37 houses are not required until full control of access is provided through the construction of interchanges and grade separations.

2.2.4 Effects on Local Business

The economic impact of a transportation facility is measured by changes in employment, income, and business activity. Measures of business activity include the number and types of firms, their employment, sales volumes, and earnings. Direct economic impact includes displacement as well as the generation of jobs and income through the purchase of goods and services needed to construct the transportation facility. Indirect economic effects include induced growth and the redistribution of economic activity because of shifts in transportation costs and accessibility to markets and resources. Transportation is one of several major factors in long-term economic growth.

The magnitude of direct economic impact in terms of the businesses and employment displaced is nil since no existing business is affected.

Indirect economic effects, i.e., induced growth and redistribution of economic activity, have been assessed subjectively in relation to specifically planned developments.

East Mountain Industrial Park

The East Mountain Industrial Park had been planned based on the provision of relatively easy access to a major new roadway facility. There is no question that the attractiveness of this Park would be greatly improved with the provision of expanded roadway facilities linking the Park with Highway 403 and Queen Elizabeth Way. It is understood that a number of firms have not located in this Park due to the poor accessibility and the availability of other serviced industrial sites in a wider area with direct access onto freeway facilities.

The Mountain Sub-Region

The Limeridge Mall, a major retail/commercial centre of approxiately 70 acres, is presently under construction at the northeast corner of Upper Wentworth and Limeridge Road. The market for the retail facilities to be included in the centre presently exists. However, the chances of success of the shopping centre will be greatly improved by the provision of a major roadway adjacent to the site.

No detrimental indirect effect on local business is forecast as a result of the roadway construction. This conclusion is based on the following:

- The accessibility from the residential neighbourhood to the collector/arterial street system is not altered. Present traffic circulation patterns are substantially maintained.

  The access to and exposure of Mohawk Nurseries located on Mohawk Road was felt to be affected adversely in the initial

plans of the roadway system. The roadway pattern was refined in a satisfactory manner.

- The diversion of traffic from the adjacent arterial street system is not foreseen as having a major impact on local business operations. The composition of traffic is almost totally intra-urban, and through traffic volumes represent less than 10 percent of the total. Consequently, the effect on highway commercial business is expected to be minimal.

In comparison with the no-action alternative, the impact on employment, income, and business activity is viewed as positive. Under the no-action alternative, access will be reduced as congestion on the existing streets will increase transportation costs. This applies not only to potential new business development, but also to the viability and competitive advantage of present business.

Residential Activity

Impacts on residential activity involve project-induced changes in the quality and quantity of housing in the Region or communities, as well as residential location patterns. These changes are a function of displacement due to right-of-way takings and changes in Regional accessibility patterns.

The impact of the proposed facility construction is considered positive due to the following:

- The planned facility location is compatible with the planned residential community development on the Mountain and the Saltfleet Community. The level of accessibility provided by the proposed facility is viewed as an essential planning tool in achieving the objectives of the Official Plan to develop this distribution of residential development.

- The recent residential development adjacent to the right-of-way in the east - west corridor has been planned under strict guidelines to achieve an acceptable living environment adjacent to the facility. Regulations have been instituted regarding noise attenuation and visual intrusion protection through the provision of an easement to allow the construction of earth berms along the right-of-way and specific techniques in the design of the dwelling unit such as double glazing of windows and air conditioning.

- The location of the roadway in relation to the present housing, the extensive landscaping planned, and the provision of sufficient noise attenuation protection will be successful in avoiding any significant change in the present living amenities. Consequently, no degradation of existing residential properties is forecast by virtue of the construction of the proposed roadway facility.

2.2.6 Fiscal Effects

This impact category is concerned with the revenues collected by municipal governments through property taxes. Transportation improvements may cause gains or losses in property tax revenues by affecting property values through areas which they pass or by consumption of land suitable for development.

A change in property value is brought about in one of several ways: by the acquisition of land for highway use which removes land from the tax rolls; by changes in the value of land adjacent to the facility; and by development of property which is added to the tax rolls.

Tax losses from property taken for roadway use have been estimated directly from current tax assessment data. The direct loss of tax revenue was approximated by applying the current residential mill rate to the average residential assessment. The total estimate was obtained by multiplying

the average residential tax by the number of homes to be acquired. The analysis suggests the loss of property taxes would be negligible in any of the affected municipalities.

Estimating property value changes and induced-growth effects is difficult. The evidence of past case studies is mixed. Studies of land use and property value changes before and after highway construction show that gains in value have been somewhat more common than losses; however, no consistent pattern has emerged.

Where property values have increased, improved accessibility has been cited as the primary reason. Losses in property values are most frequently attributed to decreases in accessibility due to congestion and increases in noise and air pollution.

In general, the current level of accessibility from the adjacent residential areas to the major collector and arterial street network has been maintained. The travel time between these areas and the present and future employment/commercial areas has been improved. The analysis of air pollution and noise impact suggests the construction of the roadway facility with the appropriate mitigating measures will not adversely affect adjacent property values.

The construction of this roadway project will provide the necessary roadway capacity to maintain an acceptable level of accessibility to the proposed residential, commercial, and industrial development south of the Escarpment. As such, it will provide a positive stimulus to the magnitude and rate of development to increase municipal tax assessment.

Many of the proposed developments, particularly residential expansion, have been predicated on the assumption that this roadway will be built. Land has been acquired and major investments have been made in the sizing and extension of municipal water and sewer improvements. The no-action alternative would not realize the total potential of these past private and public investments.

There is a tendency to view the no-action alternative as a no-impact case when, in fact, there are definite fiscal impacts that may be avoided by the proposed transportation facility. These effects relate directly to the diversion of through auto and truck volumes from adjacent streets with abutting residential development. The air and noise pollution from this traffic can depress residential property values and commercial activity. The right-of-way provided under the proposed roadway is sufficient to develop noise and visual protection of the abutting residential areas. Under the no-action alternative, little or no protection can be offered because the existing roadway right-of-way and the access requirements do not provide an opportunity to protect the abutting properties from the noise and visual intrusion.

Regional and Community Plans and Growth

Impacts on regional and community plans and growth occur when a planned transportation facility or its probable impacts are not compatible with the development goals of a region or a community.

As pointed out under the previous impact assessment factors of "residential activity", "accessibility of facilities and services", "displacement of people", and "fiscal effects", this proposed roadway is completely compatible with, and an adopted component of, the Region's recently adopted and approved Official Plan. As a result, the proposed facility is projected not to have a detrimental, only a positive, effect under this factor.

When a proposed facility has been incorporated into current planning efforts, the no-action alternative has a significant negative effect. Many community planning actions, such as zoning approvals, roadway plans, and sewer and water extensions have been planned and in some cases implemented in anticipation of this facility. A reversal in the decision to implement the roadway facility will require substantial re-planning.

Where a major facility has been delayed for a substantial period of time, a "shadow" effect may occur. When this happens, public and private in-

vestment within the corridor tends to be put off until a decisive action or no-action decision is made. In the interim, the high degree of uncertainty undermines business investment in the area and artificially depresses the real estate market. Through comments received from the public, this "shadow" effect has occurred in the east - west corridor.

2 Resources and Energy

This impact category deals with the consumption of energy and raw materials by the transportation sector. Resource consumption can be calculated in terms of:

- the energy required to operate vehicles, including cars, trucks, and buses;
- the energy consumed in the construction of these vehicles; and
- the energy consumed in the construction of roads.

As an overview, the need and sizing of the proposed facility has been developed compatible with the transportation policies of the Region's Official Plan which places emphasis on the promotion of public transit useage to reduce the use of private transportation. The vehicle demand forecasts have assumed an ambitious 50 percent increase in the current public transit ridership rate. This assumption is, in effect, a proxy for the combined impact of a number of energy conservation techniques including the introduction of an intermediate-capacity rapid transit system between the Central Business District and the Mountain residential area, carpooling, staggered work hours, and parking pricing policies. In summary, the proposed facility does not support the continued current rate of use of the private automobile, but recognizes an optimum balance in the use of public and private transportation modes.

The energy required to operate the projected volume of traffic under the proposed roadway will be less than the no-action alternative. As a result, the construction of the proposed roadway is a positive approach to reducing energy consumption. This conclusion is based on the consumption rates of vehicles operating on congested arterial streets compared to the projected free-flow conditions along the completely and semi-controlled access facilities provided under the proposed facility. Current studies indicate a 30 percent difference in consumption rates between congested arterial facilities and high-standard roadways with partial or complete access control. Applying these differences in consumption rates over the long-term period results in significant reductions in fuel consumption and cost savings to motorists.

The energy consumption of construction resources is directly represented by the estimated construction costs. Construction costs reflect both labour and material. Labour costs are principally consumed by the local labour force and create a direct benefit in terms of local employment. The consumption of raw materials for construction is not a significant factor as abundant supplies of these materials exist locally.

3. Scenic Resources, Recreational Resources, and Historic Values

This impact category covers changes that occur to the man-made and natural physical spaces and forms of the area, the quality of their interrelationships, their human uses, and their historic, aesthetic, cultural, and archaeological values. Impacts are caused directly when land is cleared and a new facility is built, and indirectly when noise, air pollution or accessibility changes disrupt the use and appreciation of the area.

The assessment of the magnitude and significance of the impact of the proposed roadway construction under this factor is based on the following documentation:

- analysis of impacts on scenic resources provided in the Phase 3 report;
- archaeological survey and heritage resource assessment completed in Phase 4; and
- recreational master plan for the Red Hill Creek Valley completed in Phase 4.

Scenic Resources

With regard to scenic resources, the assessment was subdivided into four components:

- the east - west roadway corridor above the Niagara Escarpment
- the Niagara Escarpment crossing
- the Upper Red Hill Creek Valley
- the Lower Red Hill Creek Valley and the Red Hill Creek Marsh

All the above can be categorized as urban landscape visual units. The segments are surrounded by relatively intense residential, commercial, and industrial development. In all segments, the natural scenic resource has been disturbed to greater or lesser degree by the present and past surrounding urban development.

The east - west roadway corridor above the Escarpment is surrounded by residential development. This area is rated as low in attractiveness as a natural scenic resource. Where open space provides localized areas with greater scenic value, mitigating measures such as vegetation buffers can alleviate the impacts. In the Albion Falls area, the roadway would be depressed to minimize visual intrusion. The roadway has been located as far south of Albion Falls as possible to further reduce the potential impact. As a result, the roadway impact on the scenic resources of this unit is considered low.

The wooded Niagara Escarpment is rated as attractive. The natural scenic resource has been disturbed by the present Mount Albion Road crossing and the existing H.E.P.C. transmission tower construction. The proposed roadway crossing has been confined to the area of the Mount Albion Road crossing and the H.E.P.C. transmission tower construction to minimize the further disruption of this scenic resource. Consequently, the absolute impact of roadway construction is considered moderate due to the present disturbance of the area by current development, the confinement of the roadway along established barriers, and provision of vegetation buffers throughout the length of the facility in this area.

In the Upper Red Hill Creek Valley, the ratings for scenic resources vary from "average attractiveness" in open areas to "attractive" in wooded areas. The scenic resources of the Upper Valley are an integral part of the Niagara Escarpment system. South of the T.H.& B. Railway crossings, the scenic view of the Valley is uninterrupted by roadway crossings. The impact of the roadway construction on the urban scenic resource is significant. Mitigation of the impact has been provided through:

- restriction of the roadway to the east side of the Valley adjacent to the H.E.P.C. transmission tower line;
- provision of earth berms and vegetation buffers; and
- maintenance of current pedestrian access from the residential areas to the Valley.

In the Lower Red Hill Creek Valley and the Red Hill Creek Marsh, the scenic resources are rated "average in attractiveness". The present scenic resource is substantially disturbed by the present urban development on each side of the Valley, numerous roadway and railway crossings, and the Queen Elizabeth Way at the northern end of the Valley. The impact of the roadway construction is considered moderate and mitigation is possible.

Recreational Resources

The results of the recreational master plan analysis indicates the potential for recreational development in the Valley will not be precluded by the construction of the proposed roadway. The approximate magnitude of this roadwas construction is expressed below:

Type of Open Space	Present Acreage	Residual Acreage
King's Forest Golf Course	180	180
Existing Recreational Areas	76	67
Potential Active Recreation	68	33
Potential Passive Recreation	380	267
Total	704	547

The reduction in the available recreational land totals approximately 22 percent.

The geographic area under consideration for the master plan consists of four distinctive areas - each with its own characteristics and potentials. These are the following:

- the flat area above the Escarpment consists of (relatively) low topographic relief, with a meandering water course and scattered blocks of trees separated by old field/grass communities. The Upper Ottawa Street Landfill is a major feature.

- the Escarpment face and gorge of the Red Hill Creek have steep slopes that are heavily wooded. Scenic views and fast-running water are notable features.

- the broad area of outwash materials north of the Escarpment contains a varied topography, defined creek valley and extensive, intermixed plant communities.

- north of Greenhill Avenue, the Valley becomes much narrower and is confined by valley walls and adjacent urban land uses. The Valley bottom is of poorer soil drainage and the vegetation communities indicate a high degree of disturbance due to past agricultural uses.

The characteristics of these four areas are a major determinant in the best recreational use of the Valley.

The Red Hill Creek Valley presently offers a number of recreational opportunities. The portion of the Valley between the Escarpment and King Street offers the largest number of facilities including both Glendale and King's Forest Golf Courses, a ski hill, 5 baseball diamonds, 2 soccer fields, a children's playground, Rosedale Arena, tennis courts, and a large amount of passive recreational space.

The lower portion of the Valley, between King Street and the CNR tracks, offers fewer opportunities due to the narrow character of the Valley and the poorly-drained valley bottom. This area contains 6 baseball diamonds, a sports field, and a large area of undeveloped passive recreational space.

A review of the recreational space available in adjacent neighbourhoods and communities indicates that only two neighbourhoods on the east side of the Lower Valley, Kentley and Corman, have a shortage of neighbourhood parks and that there is no shortage of community parkland.

The upper portion of the Valley contains a large area of presently undeveloped recreational land. This land has the natural potential to provide numerous passive recreational activities.

A field survey of Valley users has been undertaken in order to identify current activities and patterns of recreational use. The survey visitations were selected to offer a balanced cross-section of times (day/evening and weekday/weekend).

The conclusion that may be drawn is that the Valley is used primarily for passive or active recreation in a natural urban setting. It is very much a connective link between adjacent land uses and activity nodes. This use of the Valley occurs without the development of facilities to encourage such use.

The spatial distribution of users in the Valley is uneven. North of Barton Street, very low recreational use occurs (6 percent of the total). From Barton Street to King Street, the use increases (13 percent). From King Street to Albion Falls, a total of 81 percent of the users were observed. Particularly, the area around Albion Falls is heavily used.

These two patterns - type of activity, concentrations of users - suggest a strong existing framework for a recreational master plan.

The analysis of supply and demand for recreational space according to the accepted standards for facilities has found an adequate supply of community and neighbourhood space along most of the Valley. Only in two of the neighbourhoods are there existing shortages. There appear to be possibilities to avoid any further impact and to reduce deficits. The significant areas of concern exist between King and Barton Streets.

The adopted Recreation Master Plan has confirmed the viability of maintaining and expanding the recreational use of the Valley in co-existence with the proposed roadway. The desirable objectives for the recreational facility can be achieved. Accordingly, the impact of the proposed roadway construction is considered moderate.

Historic Values

In terms of prehistoric archaeological sites within the corridor, no such cultural remains were encountered which should be studied further, excavated or preserved. This is due to the areas under study being heavily disturbed with very little contextual information remaining.

With regard to the built environment, the stone structures at Upper James Street and in the Albion Mills Community are the major heritage resources within the roadway corridor.

In general, the impact of the roadway construction on archaeological sites is minimal and not significant. The impact on heritage resources is limited and can be mitigated through relocating these structures should the value of these building warrant removal prior to construction.

2.2.10 Effects on Natural Environment

An ecosystem consists of living organisms in an area and their non-living or abiotic environment with which they are inseparably interrelated.

Based on the extensive analysis carried out in Phase 3 of the project, adjustments in the roadway alignment were carried out to minimize the disturbance of the terrestrial and aquatic ecosystems. These adjustments principally involved avoidance of major woodlots or their significant fragmentation.

In order to provide input to the Phase 4 studies, a detailed field examination and inventory of the natural environment adjacent to the proposed roadway was undertaken. This generally covered the area between the tops-of-bank on the Red Hill Creek Valley section of the route, and within the reserved right-of-way on the east - west link. The output from the study was a map of habitat types with vegetation and wildlife notations, and an identification of specific natural environment features of significance.

In terms of the general mapping, the area can be divided into three areas. The east - west portion of the route from Highway 403 to the Upper Ottawa Street Landfill consists of disturbed lands with open field communities evident throughout. The Escarpment Area and the Upper Red Hill Creek Valley are much more significant, being covered in an extensive tract of upland hardwoods. The east side of the King's Forest area of the Valley and the Lower Valley predominantly are vegetated with plants indicating disturbed conditions. There are several small areas of higher quality trees along the Valley side slopes.

In Phase 4, 14 features at the microscale of detail were identified. These features are described below and illustrated in Exhibit 2.

Near the Upper Ottawa Street Landfill Site, at Red Hill Creek and the railway tracks: area of good habitat - belted kingfisher, gulls, western chorus frogs, groundhogs, three pairs of cardinals, eastern meadowlark.

C North of the Landfill Site: mixed, diverse habitat supporting pheasant, western chorus frogs - habitat good for deer, woodcock, pheasant, squirrels, eastern bluebird, and woodpeckers.

North of Albion Falls: nesting for short-eared owl.

D Valley at Greenhill Avenue: good variety of birds and wildlife, hardwood forest on Valley side.

E Floodplain between King Street and Queenston Road: floodplain flora and old field vegetation creates good habitat for a variety of birds.

Between Barton Street and CNR: small ponds along west side of Creek create habitat not common elsewhere.

F Near Mount Albion Village: nesting for long-eared owl.

Upper Gorge: hardwood forest, unusual plants - Green Violet, Small-Flowered Cutleaf.

Near Barton Street: unusual plants - Cow Parsnip and Water Pennywort.

Near Queenston Road: unusual plants - Honewort and Cow Parsnip.

Near King Street: unusual trees - Black Walnut and Sycamore.

Escarpment at Mount Albion: Flowering Dogwood.

M. Near Albion Falls: short-eared owl.

N. Queen Elizabeth Way: Wetland Cattail, Marsh supports diversity of fauna, particularly birds.

In addition to these features, the habitat types along the alignment have been compiled and specific trees worthy of protection have been identified and documented in the Phase 3 analysis.

As a result of the interactive planning process carried out in Phase 4, five of the above areas, Features C, D, G, H, and M, have been completely avoided through the refinement of the roadway alignment. Of the remaining areas, the impact on all but two is considered moderate.

Features E, F, I, and J occur within the Lower Valley, from King Street north. They include pockets of diverse habitat, mixing wet depressions with lowland trees, supporting flora and fauna of interest. The road will consume most of the land in the Lower Valley. However, various interconnected pockets will continue to exist. Thus, the impact can be mitigated by conserving these pockets and providing new ones where possible. This would require a more detailed ecological design during final design and construction of the road. Since the natural features, particularly plants, are those of disturbed species (not sensitive), this task does not require a high degree of sophistication to execute.

Features J and L are plant specimens of interest. Feature L includes an area of unusual showy Dogwood. Final alignment of the road and salvage transplanting will retain these plants in the area. Feature K includes several large trees (Black Walnut, Sycamore). Transplantation is probably too difficult. Thus if, in the final design, the trees cannot be retained, they will be lost.

At the Upper Ottawa Street Landfill Site (Feature A), the roadway alignment has been kept as close as possible to the Landfill Site to minimize the fragmentation of the existing woodlot. A minor stream diversion is

planned for the Red Hill Creek in this location. As the wildlife present is principally avaian wildlife and urban-tolerant mammals, reptiles, and amphibians, the impact of road construction and maintenance on terrestrial wildlife is projected to be moderate.

The impact on the Red Hill Creek Marsh (Feature N) will be significant and difficult to mitigate. However, in assessing significance, the impact of the proposed construction was viewed in relation to the existence of the Queen Elizabeth Way and the planned expansion of the Queen Elizabeth Way between Burlington Street and Highway 20.

The Marsh area is presently highly disturbed by virtue of being adjacent to the Queen Elizabeth Way, the construction of the H.E.P.C. transmission towers, and the CNR spur line to Lang's Foods. The planned interchange has been restricted to the south side of the railway to restrict the disruption to approximately half of the present Marsh area. Viewed in this context, the additional impact due to the construction of another interchange in this area is not considered significant.

With respect to general mitigation measures, the Ministry of Transportation and Communications manual, Highway Construction Practices and Potential Environmental Concerns (revised 1980), will provide adequate guidance for protecting the general environment of the roadway during construction.

2.2.11 Air Quality

There are several measurable pollutants generated by internal combustion engines. One of these, CO (carbon monoxide), has been found in studies of air quality to exceed recommended levels at distances from the source consistently in excess of the distances for other pollutants.

On this basis, the initial evaluation projected only CO levels. A computer model at the Air Resources Branch of the Ministry of the Environment was used to carry out the calculations. The model took into account the peak-hour volume and speed of the traffic and the percentage of truck traffic. The traffic volumes from the most heavily travelled section of the proposed roadway were used.

The results of the calculation indicated that, at a distance of 20 metres from the pavement edge, a CO concentration of 6 parts per million would be exceeded only 1 percent of the time. The calculations also indicated that the maximum concentration would be 18 p.p.m.

The regulations of the Environmental Protection Act establish "desirable ambient air quality criteria". The criteria for CO is 30 p.p.m. over a one-hour period. On this basis, it was concluded that the impact on air quality is not significant as the magnitude of the change is small and, further, it is restricted within the roadway right-of-way.

2.2.12 Noise Impacts

An in-depth investigation of noise pollution was undertaken in Phase 4 of the project. The assignment included refinement of the magnitude, incidence, and significance of the potential noise impacts and the possible strategies to mitigate the effects. The findings and recommendations are summarized below:

East - West Corridor

The noise impact along the Mountain East - West Arterial is projected to be relatively minor and generally insignificant as a result of the implementation of the new roadway. Based on field measurements, it was concluded that this area experiences sound exposures in the range of 50 to 55 dBA ($L_{eq_{24}}$). With the planned earth berming, the projected noise level changes can be retained within the road allowance and dedicated easements. This conclusion is supported by the data provided in Table 2.1.

North - South Corridor

The existing environment in or beside the Red Hill Creek Valley was found

to be very quiet at the southern portion (King's Forest Park). North of the T.H.& B. Railway crossing, higher sound exposures pertain typical of an urban area, primarily as a result of the existing road network. North of Barton Street, the adjacent development is industrial. Noise impact on industrial and commercial land use is not considered of concern as the generated traffic noise will not result in a significant change in present noise levels. Consequently, the analysis focused on the section through the Red Hill Creek Valley from Albion Falls to Barton Street.

The existing and planned recreation areas within the King's Forest Park area and adjacent residential properties are projected to experience significant increases in sound exposures of up to 15 dBA. However, noise mitigation is possible to produce reductions of 8 to 12 dBA, and thus it will be possible to maintain the resulting ambient noise level in the residential areas adjacent to the facility within the acceptable standards established by the Ministry of the Environment.

Table 2.2 summarizes the incidence and magnitude of noise exposure changes on the residential households located adjacent to the facility. The significance of the impact has been assessed in comparison with the adopted standards. As virtually all the increase in the noise exposure can be contained within 60 dBA ($L_{eq_{24}}$) consistent with normal urban conditions, the impact is considered acceptable.

ENGINEERING STUDIES

Traffic and Public Transit Analysis

Using the forecasted land-use development estimates prepared by the Planning and Development Department and incorporated in the Region's adopted Official Plan, projections of future travel demand were prepared for both 1986 and 2001. This distribution of total person-trips was then split into vehicle-person trips and transit trips.

The modal split relationship assumed for 1986 is similar to current mode choice behaviour in Hamilton. For 2001, a significantly higher shift to

Table 2.1

SUMMARY OF NOISE IMPACT ANALYSIS

MOUNTAIN EAST - WEST ARTERIAL SEGMENT

Section	Existing* Noise Level	Future** Noise Level	Projected Change
Upper Horning Road - Upper James Street	52	55	3
Upper James Street - Upper Sherman Avenue	53	55	2
Upper Sherman Avenue - Upper Ottawa Street	52	56	4
Upper Ottawa Street - CNR	41	56	14

*All noise levels expressed as $L_{eq_{24}}$ (dBA)

**Estimated noise level with mitigation effect of acoustical barriers

Note: Ministry of Housing, Ontario "Guidelines on Noise and New Residential Development Adjacent to Freeways" stipulate the following:

- the objective for predicted sound levels in outdoor recreational areas is 55 dBA or less.
- residential development will be prohibited where the attenuated sound level in outdoor recreational areas will exceed 70 dBA.

Table 2.2

SUMMARY OF NOISE IMPACT ANALYSIS

NORTH - SOUTH PARKWAY SEGMENT

Section	Existing* Noise Level	Future** Noise Level	Projected Change
CNR - Mud Street	52	56	4
Mud Street - Greenhill Avenue	47	53	6
Greenhill Avenue - King Street	52	59	7
King Street - Queenston Road	55	60	5
Queenston Road - Barton Street	57	60	3
Barton Street - CNR	58	60	2

*All noise levels expressed as $L_{eq_{24}}$ (dBA)

**Estimated noise level with mitigation effect of acoustical barriers

Note: Ministry of Housing, Ontario Guidelines on Noise and New Residential Development Adjacent to Freeways stipulate the following:

- the objective for predicted sound levels in outdoor recreational areas is 55 dBA or less.
- residential development will be prohibited where the attenuated sound level in outdoor recreational areas will exceed 70 dBA.

public transit was assumed possible reflecting the current Regional policies of encouraging higher useage of transit, particularly in those corridors approaching the central area of the City. This modal split relationship is consistent with transportation policies which include limiting parking availability, imposing higher parking rates, and providing a higher-speed, exclusive right-of-way transit system operating between the Mountain and the Central Business District. This higher modal split relationship was not assumed for the 1986 analysis as it is not considered possible to introduce these long-term transportation policies within the short-term period.

The Ontario Municipal Board decision approving the development of the Allarco lands in Ancaster necessitated a review of the projected traffic forecasts utilized in the Phase 3 analysis.

After internal discussion with staff of the Regional Planning Department, it was concluded the projected 2001 control population of 550,000 for the Region would remain unchanged. In addition, the 2001 population of the Allarco development would not exceed 18,800. The ultimate population of 25,750 would not be achieved for some time after 2001.

As a result, the original population and employment distribution was adjusted. The population growth of 18,800 allocated to the Allarco development was taken from the residential lands on the west Mountain. Further, an additional 4,000 population was shifted from the west Mountain area of Hamilton and allocated to Flamborough. Consequently, the assumed distribution of population does not represent the maximum holding capacity of the Mountain area within Hamilton. The employment allocation for the Allarco development was shifted principally from the Central Business District and the East Mountain Industrial Park employment allocation.

In addition to the population and employment re-allocation, minor changes were incorporated in the computer simulation to refine the modelling procedure for revised traffic assignment.

The steps followed in arriving at a final assignment included a number of manual adjustments which are listed below.

(i) assignment revisions to adjust for the impact of zone centroids connected directly into the arterial intersections;

(ii) reduction of the link volumes along the east - west arterial to remove "short trips" utilizing only one link of the facility;

(iii) adjustment of peak direction traffic volume interchange between the Queen Elizabeth Way and the North - South Parkway to be compatible with the current Skyway Corridor study. This adjustment is required to more properly reflect the peak traffic generation rate from the Bay Front Industrial Area due to the three-shift work schedule which was difficult to introduce directly into the simulation procedure; and

(iv) adjustment of the turning movements along the entire facility to account for the location of the zone centroids and present traffic distribution across the adjacent arterial street network.

... assignments. The network which was built with these changes, including the North - South Parkway/Mountain East - West Arterial alignment, was used for the assignment of vehicle traffic associated with the approved Official Plan land use assuming the Allarco development.

1. Changes Relating to Facility

(a) Centroid connectors crossing the Mountain East - West Arterial were replaced with links connecting to the north - south arterials to eliminate looping of trips.

(b) Turn penalties along the facility were reduced, with full interchanges permitted at all roadways except:
- Pritchard Road/Arbour Road - grade-separated
- West Fifth - grade-separated
- Mohawk/Golf Links - grade-separated

(c) Speeds on the facility were coded directly in the network, rather than by link modification cards, to ensure distribution based on the higher speeds.
- Mountain East - West Arterial coded at 50 km/h
- North - South Parkway coded at 80 km/h

2. Other Changes to the Network Within the Region

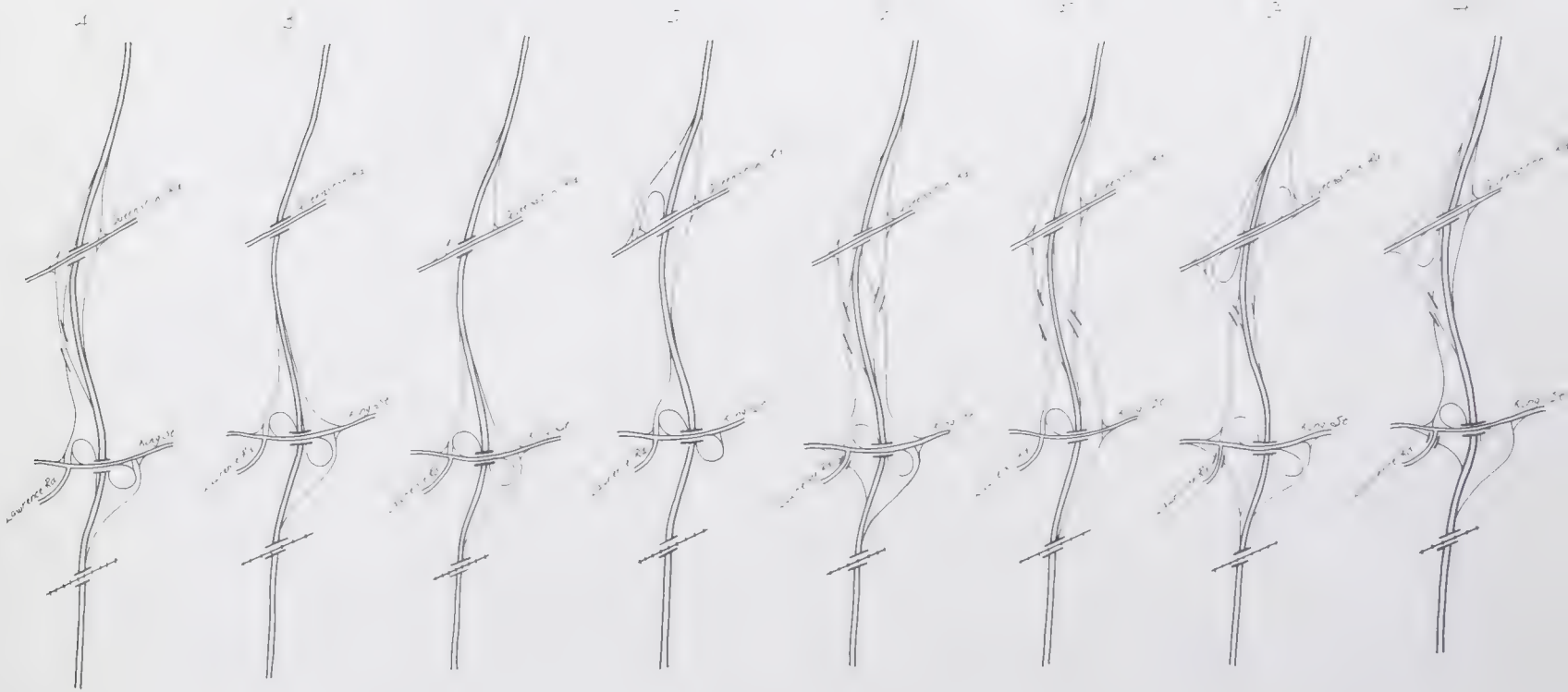
(a) Speeds on arterial roads were increased in the lower City of Hamilton, and on the north Hamilton Mountain. Most sections previously coded at 25 km/h are now at 35 km/h, with some sections of major roads such as Main and King coded at 40 km/h. Speeds on the Mountain access roads were also increased to 30 and 40 km/h.

(b) James Mountain Road was made one-way southbound to reflect p.m. peak-hour directional flow.

(c) Two illogical links on the Hamilton Mountain were eliminated.

(d) Dickenson Road speeds were reduced from 60 to 40 km/h to discourage trips which had been short-cutting from Highway 6 to Rymal Road.

The final 2001 network and facility traffic assignments are illustrated in Exhibit 3. The major conclusions of the analysis are given below.



MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

KING STREET / QUEENSTON ROAD INTERCHANGE ALTERNATIVES

DeLCan

with Mount Albion Road was rejected since this extension would be very costly compared to other schemes, would not provide a suitable connection between the Parkway and Lawrence Road and would create extensive property disruption in the vicinity of Hixon Road.

In brief, Schemes E and F were rejected because of the magnitude of the land dedication required in the narrow portion of the Valley. The additional construction cost and land acquisition is not justified by the projected traffic volumes accommodated by the additional separate interchange ramps.

Scheme D was not considered suitable due to:

- the feasibility of the loop in the northwest quadrant being uncertain because of property restrictions; and
- the weaving length provided for southbound traffic between the two interchanges being insufficient.

Schemes B and C were rejected because of the removal of specific traffic movements at Queenston Road. As a result, greater traffic loads would be placed on the King Street and Barton Street interchanges. Ramps S-E and E-S at these two locations would be operating under forced-flow conditions in the peak periods.

As a result, the analysis focused on an evaluation of Scheme A, Scheme G, and Scheme H. Based on the detailed assessment, Scheme H was adopted. Trade-offs between property disruption, freeway operation, and arterial capacity were considered in making the selection. It was felt that Scheme H represented a reasonable balance of the trade-offs amongst the short-listed options.

3. *Dartnall Road Interchange*

A number of configurations were reviewed based on Trumpet and Diamond configurations. The Trumpet-type was preferred because:

- it is the most efficient configuration to accommodate traffic volumes and offers considerable flexibility in responding to volume fluctuations.

- the land requirements are not significantly different. In order to minimize the land consumption, a 44^{o}-loop ramp was adopted to accommodate the N - W traffic movement. While the design speed is reduced, it will be consistent with the operating speed along Dartnall Road.

- the construction cost is less due to minimizing the length of the CNR grade separation.

- there is an increase in the weaving length between the interchange and the at-grade intersection at Dartnall Road and Stone Church Road. This provides improved freeway operation through this section.

4. *Arbour Road/Pritchard Road Overpass*

The potential impact of maintaining the existing road link between Mountain Brow Boulevard and Stone Church Road is difficult to assess given the information available. While the issue is acknowledged, the approach was to maintain the integrity of the present street system where possible in order to minimize the impact of the freeway construction on local traffic patterns.

In addition, the termination of Mountain Brow Boulevard immediately west of Albion Falls may be desirable from a recreational development point of view. The continued through-traffic volumes in this area are seen as an impediment to developing an integrated recreation/open space area in this location.

Both of the above issues are interrelated. However, these are local planning issues which are not within the scope of this project.

5. [illegible]

The functional planning of this roadway included in this project is contained within the possible future intersection/interchange area with the Mountain Arterial. The location of the roadway south from the Mountain East - West Arterial to Rymal Road is dependent upon future local road planning associated with the Allarco development.

3 Geotechnical Investigations

The investigations undertaken reflect the recommendations of the geotechnical consultant's report completed in Phase 4. The scope of the work included the following:

- sufficient geotechnical analysis to provide input into finalizing the location of the roadway. In this regard, 18 borings were advanced at the following specific locations where concern was expressed related to possible geotechnical problems.

  (i) At the proposed Queen Elizabeth Way Interchange; three borings to shale bedrock to indicate the extent of suspected marshy deposits;
  (ii) At the proposed Barton Street Interchange, one borehole to 6.7 m (22 feet) depth;
  (iii) At the proposed Queenston Road Interchange, one borehole to 11.6 m (38 feet) depth;
  (iv) At the King Street Interchange, one borehole to 10.7 m (35 feet) depth;
  (v) At the Greenhill Avenue access ramp, one borehole to 15.7 m (51.5 feet) depth;
  (vi) At the CNR crossing immediately west of Arbour Road, between Limeridge and Stone Church Roads; one borehole to refusal;
  (vii) Along the proposed East - West roadway between Upper Horning Road and the Highway 403/Mohawk Road Interchange, one borehole to refusal at 6.5 m (21.5 feet) depth;
  (viii) At the proposed Escarpment crossing, five boreholes were advanced to refusal to establish the integrity of the rock formation; and
  (ix) At the T.H.& B. and CNR crossings, one boring was undertaken at each location to investigate the nature of the embankment fill at each location.

- describe preliminary geotechnical guidelines sufficient to identify areas where above-normal construction procedures will be required and which will escalate construction costs.

- supply a preliminary pavement design and an assessment of the suitability and quality of the excavated material for use as fill material.

The specific conclusions and recommendations related to the above are provided in the report submitted by The Trow Group Ltd. in December 1980.

In general, the routing which has been selected has made optimum use of as many natural and physiological advantages as is possible. By following the existing alignment set by Mount Albion Road perpendicular to the Escarpment face and across a lacustrine sand deposit, major difficulties which are normally associated with construction on talus slopes have been regulated.

The greatest relative difficulties will be encountered in construction along the length of the Red Hill Creek Valley. However, the number of existing roadway and rail lines which intersect this feature is evidence to the fact that practical and conventional construction is feasible.

4 Drainage Analysis

The analysis conducted in Phase 4 addressed the following issues:

- impact of road construction on the flooding capacity of the Valley.

- confirmation that the currently established floodline elevations did not account for the retention effects of the existing culverts at the T.H.& B. Railway, Queenston Road, and the CNR. Nor did this investigation take into account stormwater management techniques currently under investigation by the City of Hamilton.
- assess the feasibility of the proposed re-channelization of the Red Hill Creek indicated under the recommended plan.

The conclusions related to each of the above recommendations are summarized below:

1. [illegible]

The proposed design ensures the culverts will be of sufficient size so as not to interfere with the flood flows. In addition, the improvements to the existing culverts will reduce the high backwater situation due to the existing undersized culverts at the T.H.& B. Railway crossing, Queenston Road, and the CNR crossing. Due to the proximity of the site to the mouth of the watercourse, enlarging the existing culverts will not cause any flooding downstream. A proper ratio of backwater reduction to interference with flood flows by the construction of the proposed roadway will result in a negligible effect on flood levels.

While the Ministry of Natural Resources will request that any proposed bridge or culvert crossing be analyzed using the Regional storm criteria, this does not mean that the structures must be capable of passing Regional flows. The intent is to ensure no significant backwater effect is created.

Impact on Floodline Elevations

The establishment of the floodline elevations in the M. M. Dillon report was based on unrestricted flows in each section of the watercourse. This was done to protect against the possibility of existing structures being removed and/or replaced by larger structures to permit Regional flows along each section.

No effects of the possible application of stormwater techniques were accounted for. Introduction of these techniques could potentially reduce the stormwater flows and lower the current projected Regional floodline elevations within the Valley.

Creek Channelization

The suggested re-channelization of the Red Hill Creek will create minimal disturbance to the Valley walls and the number of culverts is being kept to a minimum. Channelization of part of the watercourse will be considered by the Ministry of Natural Resources since there is no concern with regard to impact on fish populations. The fact that the site is close to the mouth of the watercourse alleviates concern related to increased flows due to channelization. The Valley is well defined in this area.

3. Description of Recommended Plan

3. DESCRIPTION OF RECOMMENDED PLAN

examination of several alignments
dered. This analysis is outlined in

3.1 DESIGN CRITERIA

The Roads and Transportation Association of Canada (RTAC) design standards were used for the east - west portion of the project. Allowances were made in the grading to ensure that the initial four-lane urban arterial could be expanded to a four-lane urban freeway should it be warranted in the future. Consequently, the main line horizontal and vertical alignment conforms to urban freeway standards with a design speed of 100 km/h.

Table 3.1 lists the design criteria for urban roads with a design speed of 80 km/h, and the design criteria for urban freeways with a design speed of 100 km/h.

The design criteria used for each section of the project were chosen in order to establish a balance between the safe and efficient function of the roadway and the restraints imposed by the existing and planned natural and man-made development within the corridors.

Table 3.1

SELECTED DESIGN CRITERIA

MOUNTAIN EAST - WEST ARTERIAL

Classification	- Divided Urban Arterial
Design Speed	80 km/h
Superelevation (e max)	0.06 m/m
Horizontal Curve	250 min.
Lane Width	3.75
Grade - Min.	- 0.30%
Max.	- 6.0%
Vertical Curve - Sag - Min. K	30
Crest - Min. K	35
Des. K	55
Side Slopes - Cut	- 3:1
- Fill	3:1 in Heights of Fill 1.2 m or less 2:1 in Heights of Fill Over 1.2 m
Back Slopes - Cut	- 2:1 max (3:1 at Berm)

NORTH - SOUTH PARKWAY

Classification	- Divided Urban Freeway
Design Speed	100 km/h
Superelevation (e max)	- 0.06 m/m
Horizontal Curve	420 min.
Lane Width	3.75
Grade - Min.	- 0.30%
Max.	- 5.0%
Vertical Curve - Sag - Min. K	- 50
Crest - Min. K	- 70
Des. K	- 110
Side Slopes - Cut	- 3:1
Fill	- 3:1 in Heights of Fill 1.2 m or less 2:1 in Heights of Fill Over 1.2 m
Back Slopes - Cut	- 2:1 max.

3.2 CROSS SECTIONS

A four-lane urban cross section is proposed for the initial stage of the Mountain East - West Arterial. The section consists of two 3.75 metre lanes in each direction with a 6 metre raised median which allows for left-turn bays with lanes of 3.5 metres at all major cross-street intersections. Noise attenuation berms would be constructed, where required, to a minimum height of 3.7 metres. An allowance of 7 metres from the edge of pavement to toe of slope at the berm has been made to facilitate the expansion to an urban freeway section in the future. This means that once the grading has been completed for berms and side slopes, it would not have to be disturbed again. The proposed back slopes on berms and cut sections are 2.5:1 to assist in confining the roadway excavation within the 61 metre right-of-way. Grading for the berms would be accommodated, where necessary, within the 15 metre easements on either side of the right-of-way.

The cross section proposed for the North - South Parkway is a basic six-lane urban freeway. The section consists of three 3.75 metre lanes in each direction with a 7 metre median which contains a 3 metre shoulder on each side of a New Jersey-type concrete barrier. Noise attenuation berms would not be required in the Valley but would be constructed at other locations where required. The proposed side slopes are 3:1 in heights of fill 1.2 metres or less and 2:1 over 1.2 metres to assist in keeping the amount of property required to a minimum. Back slopes are 2:1 maximum.

Exhibit 28 illustrates the typical roadway cross sections for the Mountain East - West Arterial and the North - South Parkway.

RIGHT-OF-WAY

Mountain East - West Arterial

Right-of-way for the east - west corridor has been acquired by the City of Hamilton and the Region as it has become available over the past several years. Although property has yet to be acquired throughout its length, a 61 metre strip with additional property at interchange areas has been protected from the west limits of the City of Hamilton to east of Upper Ottawa Street.

Easements 15 metres wide along either side of the right-of-way allow for the construction of noise attenuation berms.

North - South Parkway

A basic 90 metre right-of-way will be required in the north - south corridor. Additional property will be required at all interchange locations and areas of large cuts and fills.

North of Mud Street, the Parkway is located almost entirely on property owned by the City or the Region and very little would be required from the private owner.

3.4 TRAFFIC

As described in Section 2.3.1, the projected traffic volumes along the facility were refined to account for revisions in the computer modelling process and the adjustments to the proposed facility. The traffic volumes are illustrated in Exhibit 3.

The lane requirements for the roadway facility were based on capacity operation given the 2001 traffic assignment.

The results of the analysis indicate that a basic four-lane, limited access, east - west arterial, with intersections at-grade with the major north - south arterials, will be sufficient to accommodate the projected volumes between Glancaster Road and Upper Gage Avenue. At the west limits, the section between Glancaster Road and Highway 403 will require complete control of access in order to accommodate the planned Allarco development at a population of 18,800 residents.

East of Upper Gage Avenue, a six-lane, at-grade arterial is required to

provide a smooth transition section between the Mountain East - West Arterial and the North - South Parkway sections.

In the north - south segment of the facility, a basic six-lane freeway facility will be required to accommodate the projected volumes from Dartnall Road through to Barton Street. North of Barton Street to the Queen Elizabeth Way, a four-lane freeway section is proposed.

3.5 TRANSIT

The major focus for transit in accordance with the Region's Official Plan has been on the Central Business District where transit can be most successful in providing an attractive alternative to auto use.

The diversion of a significant amount of auto traffic from the adjacent arterial system will result in an overall improvement in surface transit operating speeds along these arterials. As the proposed roadway facility is accommodating auto travel between those less-concentrated residential developments to the dispersed employment opportunities north of the Escarpment, transit travel demand is projected to be low along the proposed roadway alignment. As such, no transit priority treatments (such as exclusive bus-lane operation) have been incorporated into the roadway plan.

3.6 ALIGNMENT

East - West Arterial

The horizontal alignment between Upper Horning Road and Upper Ottawa Street is basically that established in previous studies. It is a tangent section with several small deflection angles which do not require the use of curves.

The alignment west of Upper Horning Road is curvilinear with curves of 600 metre radii. The alignment was connected to the existing Mohawk Road as quickly as possible west of Upper Horning Road to take advantage of the existing road allowance on Mohawk Road and to attain as much weaving distance between the ramps at Highway 403 and Glancaster Road interchanges as possible.

[illegible] Parkway

The horizontal alignment for the North - South Parkway is mainly curvilinear which was dictated by the numerous controls encountered.

The alignment between Dartnall Road and Mud Street is a continuous 700 metre radius curve. It was located as far as possible to the south to minimize the impact on the Albion Falls conservation area to the north without disrupting the recently constructed bowling alley situated on the north side of Stone Church Road. It also avoids the Hydro towers east of Pritchard Road.

North of Mud Street to the Park Access Road at Mount Albion Road, the alignment has been split on either side of the Hydro tower line creating a 50 metre-wide median. This was done so that the grades could be varied between the two independent northbound and southbound roadways as much as possible to fit the existing topography and reduce the property requirements on the east side of the Parkway.

The northbound lanes roughly follow the existing Mount Albion Road alignment across the Escarpment on the east side of the Hydro tower lines with 1000 metre and 450 metre radii curves. This avoids acquiring property from the golf course situated along the east side of Mount Albion Road. The southbound lanes cross the Escarpment on the west side of the Hydro tower line with 600 metre and 450 metre radii curves. Access to the tower line is provided from the Park Access Road in the Parkway median. The alignment north of the Park Access Road at Mount Albion Road follows the top of the Valley to Greenhill Avenue on a tangent section with a 2000 metre radius curve being introduced at Greenhill Avenue. It then proceeds through the Valley to the Canadian National Railway line, at which point the Valley becomes quite restricted in width. The controlling radius in this section is 450 metres which appears in a number of locations throughout the Valley. The alignment then follows the

Creek north and interchanges with the Queen Elizabeth Way.

Every attempt has been made to keep the roadway within Region- or City-owned property through the Red Hill Creek Valley.

The location of the Parkway alignment at the cross streets is fixed because of the interchange configurations and availability of right-of-way at their locations. An attempt has been made to keep the alignment, between interchanges, to one side of the Valley to retain as much parkland and recreation area as possible. The Creek has been re-channelled in several areas to minimize the number of crossings.

PROFILE

The vertical alignment through the east - west corridor has been established to freeway standards although the initial construction planned is for an urban arterial roadway with at-grade intersections with the major cross streets.

The grades have been established to create a balance, where possible, between excavation for the arterial roadway and fill for the noise attenuation berms. The roadway will be fully depressed either by excavating or by the creation of berms so that the minimum height between the top of pavement and the top of the excavation or berm is 3.7 metres. An attempt has also been made to keep the amount of cross-street reconstruction to a minimum with the construction of the arterial by reducing the amount of excavation through the intersection and yet maintaining freeway standards.

The profile at the west end of the project meets the existing grade of Mohawk Road immediately east of the Highway 403 interchange.

Although the terrain is relatively flat throughout the east - west corridor, vertical curves were introduced where necessary to achieve the desired results. The minimum sag curve has a K value of 70 and the minimum crest curve has a K value of 80. The grades throughout the east - west corridor vary between a minimum of 0.30 percent and a maximum of 2.0 percent.

Preliminary estimates of earth quantities indicate that there is surplus material to be disposed of.

North - South Parkway

The vertical alignment in the north - south corridor conforms with the rolling terrain from Upper Ottawa Street to north of Greenhill Avenue. After descending into the Red Hill Creek Valley, it becomes very flat until it reaches Brampton Street.

The alignment east of Upper Ottawa Street is controlled by the clearance below the CNR in maintaining the existing railway grade, and the Red Hill Creek in the vicinity of Dartnall Road. The Arbour Road profile was raised slightly to minimize the amount of excavation through the area. The major concern is the large rock excavation and fill where the alignment crosses the Escarpment north of Mud Street. The initial soils investigation in this area pointed out the concern of such an undertaking but that no special construction technique need be employed. A more detailed investigation was carried out which confirmed the initial results and that conventional construction methods could be employed.

The proposed grade across the Escarpment is 5.0 percent which is the maximum for the project. The minimum grade, which occurs in the Valley, has been established at 0.40 percent. In maintaining the existing CNR grade across the Valley, the proposed freeway alignment is dictated by the clearance required below the railway. The proposed grade for the remainder of the Valley has been established at an average of 2 to 3 metres above the Valley floor to minimize the impact on drainage and the possibility of flooding.

A minimum sag curve with a K value of 50, and crest curve with a K value of 120 have been established for the north - south corridor.

The proposed profiles are illustrated in Exhibits 14 to 27.

3.8 INTERSECTIONS, INTERCHANGES, AND GRADE SEPARATIONS

East - West Arterial

Major arterial streets crossing the east - west corridor will intersect the proposed roadway at grade. The only exceptions are the Mohawk Road/Golf Links Road connection and West Fifth Street which will be grade-separated with no access to the proposed roadway. The Mohawk Road/Golf Links Road connection will not intersect the east - west roadway because of its proximity to the Highway 403 interchange. West Fifth Street will be grade-separated to provide uniform spacing between the remaining signalized intersections.

At-grade intersections with left-turn bays will be provided with the following streets:

- Glancaster Road
- Upper Paradise Road
- Garth Street
- Upper James Street
- Upper Wellington Street
- Upper Wentworth Street
- Upper Sherman Avenue
- Upper Gage Avenue
- Upper Ottawa Street

North - South Parkway

Interchange locations and types were developed based on projected traffic movements and the ability to adapt to the restrictions imposed upon them by the Red Hill Creek Valley and adjacent property.

Interchanges are planned for the following locations:

- Dartnall Road
- Mud Street/Trinity Church Road
- Greenhill Avenue
- King Street
- Queenston Road
- Barton Street

Grade separations with no access to the facility are planned with the following streets:

- Arbour Road/Pritchard Road
- Agate Street
- Mount Albion Road Park Access
- Brampton Street

Interchange spacings between Greenhill Avenue and the Queen Elizabeth Way are at a minimum. Although weaving lengths are adequate, ramp terminals are located close enough together so that continuous acceleration and deceleration lanes are provided between interchanges in most cases.

Dartnall Road Interchange

The interchange proposed for this location is a Trumpet with a 40 metre loop. Its primary function is to provide access to the industrial land immediately to the south. A 40 metre loop has been adopted to minimize the property requirements in the vicinity of the conservation area to the north.

Mud Street/Trinity Church Road Interchange

The interchange proposed for this location provides access to the Saltfleet Community in the east by Mud Street, and access from the industrial area in the south and connection to Highway 53 by Trinity Church Road.

Although the freeway interchanges with two arterials, the connections to these streets are relatively direct and free-flowing.

Greenhill Avenue

The Greenhill Avenue interchange is a Trumpet. A 40 metre loop has been used to keep the interchange ramps from protruding into the Valley. It will provide access to and from the Vincent/Red Hill neighbourhoods.

King Street

The Parclo "A" type of interchange at King Street accommodates all traffic movements, with the exception of ramps from King Street, east to north and the return from the north to King Street East. Because of the weaving problems that would be created with the closeness of the Queenston Road interchange, these movements have been eliminated and the ramp from the north to King Street is grade-separated with the ramp from Queenston Road to the south.

Lawrence Road is also accommodated in the interchange configuration and is aligned with the ramp complex on the west side of the freeway resulting in a single at-grade intersection. Fifty metre radius loops are utilized.

Queenston Road

A combination Diamond/Parclo "B" interchange has been provided at this location to handle all the traffic movements, minimize the physical impact on the surrounding area, and optimize the capacity of Queenston Road through the interchange area.

Barton Street

A Parclo "A" type of interchange is proposed at this location to accommodate the projected traffic movements. This interchange configuration fits well within the available vacant land and optimizes traffic operation.

DRAINAGE

East - West Arterial

A storm sewer system will be provided to handle the stormwater drainage in the east - west corridor. Side slopes for berms and cut areas will drain into the roadside gutters eliminating the need for swales.

The storm sewer size and location of outlets will be determined in the final design stage.

North - South Parkway

The results of a floodplain analysis carried out for the Red Hill Creek Valley indicate that construction of the proposed roadway embankment within the Valley would have only a minimal effect on flooding. A proper ratio of backwater reduction to interference with flood flows will minimize the effect of the freeway on the flood levels.

A rural freeway cross section is proposed for the north - south corridor, and the storm drainage will be carried through a system of ditches and culverts. The median will be drained by catchbasins with leads to the ditches. Drop structures will be incorporated in the major realignments to reduce the flow velocities.

3.10 RAILWAY CONSIDERATIONS

There are three railway crossings in the North - South Parkway portion of the project:

- CNR between Barton Street and Brampton Street at mile 38.6 on the Grimsby Subdivision

- CNR in the vicinity of Dartnall Road at mile 6.1 on the Hagersville Subdivision

- T.H.& B. south of King Street

The CNR has two tracks at present on the Grimsby Subdivision with future planning for two additional tracks. The line presently carries 20 trains per day. The CNR line on the Hagersville Subdivision has one track at present with future planning for one additional track. It presently carries 2 trains per day.

The T.H.& B. has one track at present with no plans for expansion in the future. The present daily train movements are 8 to 10 trains per day.

Special consideration was given to a preliminary investigation of a method of construction at the CNR Grimsby Subdivision crossing and the T.H.& B. crossing.

Because of the difficulty in re-routing rail traffic in these locations, it was suggested that methods permitting rail useage during construction may provide an attractive alternative. This may require specially designed ground support systems, some cut and cover, and tunnelling-type operations, coupled with some type of localized rail diversions.

Boreholes were put down at the two embankments to permit a more detailed analysis of the sub-soil conditions. The analysis confirmed conventional construction techniques were feasible in both these locations.

The proposed structures would be constructed in accordance with the railway requirements, and to ensure that the existing railway grades and alignment would be maintained.

The CNR and T.H.& B. Railway were contacted and the proposals discussed.

3.11 GEOTECHNICAL

Mountain East - West Arte

The investigation confirmed the feasibility of construction from a geotechnical point of view. In the east - west corridor, the soils problems cited were local in nature and are not expected to present major difficulties.

North - South Parkway

To supplement the data compiled from previous studies, eleven additional borings were advanced at those locations where some particular geotechnical problem could be anticipated. Two borings were also advanced at the T.H.& B. and CNR crossings to investigate the nature of the embankment fill at each location. It was found that, at select points along the route, virtually every type of soil which is characteristic to the Hamilton area is represented with subsequent significantly varying results on road design and construction.

Major problems associated with the geotechnical conditions are not anticipated although special consideration should be given to design and the construction techniques employed in areas of rock excavation and the railway grade separations crossing the Valley.

Subsequent to the submission of the Phase 4 geotechnical report, additional borings were requested by the Ministry of Transportation and Communications in the vicinity of the Escarpment crossing. The investigation confirmed the feasibility of constructing a roadway in the proposed location is possible without encountering major difficulties, and the alignment represented an ideal location for a roadway Escarpment crossing in the Mount Albion Road area.

1 UTILITIES

Mountain East - West Arterial

Existing utilities were located on a preliminary basis from information made available by the Region and the various utility companies.

Underground utilities crossing the east - west corridor have been placed at a sufficient depth and the proposed grade of the arterial has been established to avoid conflicts. Overhead utilities on major streets crossing the corridor would have to be relocated for widenings and grade separations.

North - South Parkway

Major utilities in the Red Hill Creek Valley do not present clearance problems since the proposed Parkway grade is 2 to 3 metres above the Valley floor.

Bell Telephone, Hydro, gas and watermains located on the streets crossing the Valley would have to be relocated.

The storm and sanitary sewers on Arbour Road would have to be relocated because of the excavation required for the Parkway construction. Hydro towers between Stone Church Road and Greenhill Avenue have been avoided. A possible conflict could occur with the Trans-Northern Pipe Line where it crosses the Escarpment along Mount Albion Road north of Mud Street. This will be subject to further investigation in the detailed design phase.

STAGING AND IMPLEMENTATION

The staging program reflects the priority of construction for major route segments, a logical construction sequence, and recognition of the financial capabilities of the Region.

The major priorities for the road construction are based on the development objectives of the Region and the projected location of the deficiencies in the road network as growth and expansion takes place. These factors and issues are listed below:

- provision of expanded roadway facilities to improve accessibility between the Mountain residential areas and the employment opportunities north of the Escarpment. The improved accessibility will allow continued growth of the Saltfleet Community and the planned residential areas south of Limeridge Road.

- removal of through traffic and truck traffic from the adjacent parallel arterials with abutting residential development.

- minimize the magnitude and duration of construction disruption on the adjacent neighbourhoods.

- initial staging of construction should not represent the ultimate facility in order to be compatible with a possible dramatic shift to public transit.

- tailor construction costs to an approximate annual expenditure of $10 M.

Based on the above, the staging focused on the provision of a new roadway facility between the arterial roadway network above the Escarpment to the arterial system below the Escarpment. The initial completed roadway would provide a basic four-lane facility. It would satisfy the basic objectives as:

- it would provide expanded roadway capacity to accommodate the expansion of the Saltfleet Community and the development of the Mountain Industrial Park;

- it would remove through traffic from Mount Albion Road and reduce truck traffic along the Kenilworth Access and Centennial Parkway; and

- the proposed construction can be accomplished with little disruption of local circulation patterns.

The staging of construction is illustrated in Exhibit 29, and discussed in the remainder of this section of the report.

Stage 1 - Upper Gage Avenue to King Street

A four-lane rural freeway section will be constructed from Upper Gage Avenue to King Street. The construction will include the following structures and interchanges:

- CNR grade separation immediately west of Dartnall Road
- Arbour Road grade separation

- Mud Street - Trinity Church Road interchange
- Agate Street grade separation
- Mount Albion Road underpass structure
- Greenhill Avenue interchange
- T.H.& B. Railway grade separation
- King Street realignment and interchange construction
- Extension of Lawrence Road
- Extension of Pottruff Road to Hixon Road

As part of this stage of implementation, various local road improvements will be included:

- the realignment of Mud Street from Paramount Drive East to Paramount Drive West
- the extension of Trinity Church Road from Rymal Road to Stone Church Road
- the extension of Agate Street from Paramount Drive to Mountain Brow Boulevard

The above construction is not reflected in the construction costs given for the proposed facility.

The implementation of this stage of the proposed facility will be phased. To minimize the disturbance to traffic flow crossing the Escarpment, the southbound lanes will be constructed first and operated in both directions. This essentially replaces existing Mount Albion Road. Once this is completed and opened to traffic, Mount Albion Road will be closed to allow construction of the northbound lanes. In this way, the traffic disruption can be kept to a minimum during construction.

Stage 2 - King Street to Queen Elizabeth Way

A four-lane rural freeway section will be constructed from King Street to the Queen Elizabeth Way. The construction would include the following structures and interchanges:

- completion of the King Street interchange ramps
- Queenston Road interchange
- Barton Street interchange
- CNR grade separation
- Brampton Street grade separation
- Queen Elizabeth Way interchange

The construction cost estimates included under this project extend to the north property limits of Brampton Street. The roadway and interchange construction north of Brampton Street is the responsibility of the Ministry of Transportation and Communications.

Similar to Stage 1, the construction in Stage 2 will be phased. With the roadway access across the Red Hill Creek Valley being limited to three crossings at King Street, Queenston Road, and Barton Street, the construction phasing must be carried out to minimize serious traffic disruption.

Accordingly, it is recommended that the Brampton Street Extension be completed prior to construction beginning at either Queenston Road or Barton Street. Secondly, it is recommended Barton Street be completed prior to Queenston Road. This is suggested since the Barton Street construction can be carried out without major traffic disruption by utilizing the present Melvin Avenue crossing together with the Brampton Street Extension. Once the Brampton Street and Barton Street crossings are in place, the disruption of traffic due to the partial closing of Queenston Road can be minimized.

Stage 3 - Upper Gage Avenue to Highway 403

A four-lane urban arterial will be constructed between Upper Gage Avenue and Highway 403. Again, the construction will be phased in keeping with the financial capability of the funding agencies. The completed segments will be terminated at the major north - south arterials. With construction contained within the protected right-of-way, disruption of existing traffic patterns will be minimized.

Subsequent Stages of Construction

As growth occurs and traffic volumes increase, the ultimate development of the facility will be carried out. The estimated cost of the remaining construction to expand the initial facility totals $11,685,000, and includes the following:

- widening of the controlled access section east of Upper Ottawa Street to Barton Street to provide a 6-lane urban freeway facility
- widening of the 4-lane urban arterial section from Upper Ottawa to Upper Gage Avenue
- construction of the Dartnall Road interchange

Beyond these specific construction projects, sufficient right-of-way has been reserved to construct interchanges at:

- Upper Gage Avenue;
- Upper Wentworth Street;
- Upper James Street;
- Garth Street; and
- the Glancaster Road Extension.

The cost estimates for the individual stages are summarized in the next section based on 1980 unit prices for similar construction. These estimates are general and should be used to provide an indication of the scope of the work included in each individual stage. The phasing likely within each stage and the extended time frame for the actual construction renders the use of current unit prices non-representative.

COST ESTIMATES

A cost estimate was prepared for the project as a whole and then broken down into stages based on a logical sequence of construction and the Region's financial capabilities.

The estimate was based on 1980 unit prices obtained from recent construction projects and the major items are listed below.

Railway Structures	$1,300.00/$m^2$
Road Structures	
Sta. 10+700 to Sta. 22+750	
Single Span	$ 650.00/m^2
Multi Span	$ 600.00/m^2
Sta. 22+750 to Sta. 29+175	
Single Span	$ 750.00/m^2
Multi Span	$ 700.00/m^2
Earthworks	$ 3.40/m^3
Rock Excavation	$ 6.50/m^3
Hot Mix - HL1	$ 17.20/t
HL5	$ 14.40/t
HL2	$ 14.40/t
Asphalt Cement	$ 171.00/t
Granular "A"	$ 5.15/t
Granular "B"	$ 3.60/t

The estimate of the property required for the project was updated and included in the total cost.

TOTAL PROJECT COST ESTIMATE - 1980 BASIS

ROADWORK	
- earth excavation	$ 12,390,000
- rock excavation	2,700,000
- granular material	8,260,000
- paving	7,620,000
- curb and gutter	1,630,000
- illumination	2,260,000
- utility relocation	750,000
- drainage	1,510,000
- landscaping	2,260,000
- noise attenuation	700,000
- median barrier	360,000
- traffic signals	360,000
- fencing	740,000
STRUCTURES	
- railway structures	2,360,000
- roadway structures	17,730,000
- creek structures	6,990,000
- retaining walls	260,000
- railway detour structures	3,500,000
ENGINEERING AND CONTINGENCIES	13,640,000
PROPERTY	15,346,000
RESTORATION OF RECREATION FACILITIES	500,000
TOTAL	$101,866,000

STAGE 1 COST ESTIMATE - 1980 BASIS

ROADWORK	
- earth excavation	$ 6,590,000
- rock excavation	2,700,000
- granular material	4,050,000
- paving	3,000,000
- curb and gutter	610,000
- illumination	990,000
- utility relocation	330,000
- drainage	660,000
- landscaping	990,000
- noise attenuation	300,000
- median barrier	-
- traffic signals	80,000
- fencing	310,000
STRUCTURES	
- railway structures	1,300,000
- roadway structures	8,820,000
- creek structures	3,280,000
- retaining walls	200,000
- railway detour structures	-
ENGINEERING AND CONTINGENCIES	6,780,000
PROPERTY	5,336,000
RESTORATION OF RECREATION FACILITIES	500,000
TOTAL	$46,826,000

STAGE 2 COST ESTIMATE - 1980 BASIS

ROADWORK	
- earth excavation	$ 1,770,000
- rock excavation	-
- granular material	1,900,000
- paving	1,210,000
- curb and gutter	240,000
- illumination	440,000
- utility relocation	145,000
- drainage	290,000
- landscaping	440,000
- noise attenuation	400,000
- median barrier	-
- traffic signals	40,000
- fencing	120,000
STRUCTURES	
- railway structures	1,050,000
- roadway structures	6,880,000
- creek structures	550,000
- retaining walls	60,000
- railway detour structures	1,500,000
ENGINEERING AND CONTINGENCIES	3,020,000
PROPERTY	2,050,000
RESTORATION OF RECREATION FACILITIES	
TOTAL	$22,105,000

STAGE 3 COST ESTIMATE - 1980 BASIS

ROADWORK	
- earth excavation	$ 3,850,000
- rock excavation	-
- granular material	1,990,000
- paving	2,180,000
- curb and gutter	640,000
- illumination	600,000
- utility relocation	200,000
- drainage	400,000
- landscaping	600,000
- noise attenuation	-
- median barrier	-
- traffic signals	240,000
- fencing	310,000
STRUCTURES	
- railway structures	-
- roadway structures	1,200,000
- creek structures	-
- retaining walls	-
- railway detour structures	-
ENGINEERING AND CONTINGENCIES	2,450,000
PROPERTY	6,590,000
RESTORATION OF RECREATION FACILITIES	-
TOTAL	$21,250,000

4. Public Involvement Program

4. PUBLIC INVOLVEMENT PROGRAM

involvement program carried out in P
a section of the report, together
of the response.

4.1 INTRODUCTION

The purpose of the Phase 4 program was to provide the public with further detailed information on the selected roadway facility and a possible recreational development plan for the Red Hill Creek Valley.

A series of four public information centres were provided at the following locations:

Location	Date and Time	Recorded Attendance
Roxborough Public School	Monday, June 23, 1980 2:00 p.m. to 9:00 p.m.	117
Albion Public School	Tuesday, June 24, 1980 2:00 p.m. to 9:00 p.m.	102
Mount Albion School	Wednesday, June 25, 1980 2:00 p.m. to 9:00 p.m.	65
Hill Park Secondary School	Thursday, June 26, 1980 2:00 p.m. to 9:00 p.m.	70

The information centres were well advertised in the media. Public brochures were distributed to 200 groups and individuals and were made available in the major public buildings in the Region. The brochures outlined the locations and dates, study progress, and the content of the information to be made available at the public meetings.

Representatives of the Regional Engineering and Planning Departments, and the Consultant's staff were available to answer questions. Several graphical displays were provided, including:

- details regarding the scope of the work;
- 1:2000-scale plans of the alignment and profile of the proposed roadway facility. These plans identified property acquisitions, modifications to the local street system, and cross-sectional treatments at critical points along the facility;
- various perspectives of the Red Hill Creek Valley illustrating the relationship of the roadway to the surrounding development. The "before" and "after" conditions were exhibited.
- the requirements of the Environmental Assessment Act and the implications for this project; and
- the procedure, content, and results of the recreational master planning for the Red Hill Creek Valley area.

4.2 SUMMARY OF PUBLIC COMMENT

The comments and opinions of the public were recorded through the response to the questionnaire distributed at the information centres. The public information centre questionnaire is reproduced in Exhibit 30. The tabulation of the major comments received under each question is summarized below. In total, 120 questionnaires were completed.

Question 1 - Comments regarding the proposed roadway proposal

- disapprove of Red Hill Creek Valley location (20 of 89 responses)
- freeway is not needed (8 of 89 responses)
- roadway location will have severe impact on people living adjacent to the facility (7 of 89 responses)
- in agreement and consider it well planned (11 of 89 responses)
- Mount Albion Road should not be closed at King Street (8 of 89 responses)

Question 2 - Which of the following issues were most important to you?

1. Traffic noise - 58
2. Effect on vegetation and wildlife - 51
3. Visual appearance - 45
4. Effect on potential recreational land - 44
5. Access to your home and work - 37
6. Pedestrian circulation - 18
7. Property requirements - 14
8. Proximity to schools - 14

Question 3 - Do you consider the proposed recreation master plan to be:

Good/Acceptable - 54
Unacceptable - 41

Question 4 - What issues should be investigated further?

- no further issues should be investigated (8 of 96)
- the need for the proposed roadway (9 of 96)
- the effect on the natural and man-made environment (6 of 96)
- other north - south alternatives (22 of 96)
- the devaluation of adjacent residential property (6 of 96)
- the need to close Mount Albion Road at King Street (7 of 96)

Question 5 - Other Comments

The written comments received under this question did not raise any additional issues, but rather tended to expand on the comments provided in the previous four questions.

Appendix A
Listing of Interim Reports - Phase 4

APPENDIX A

LISTING OF INTERIM REPORTS - PHASE 4

1. REASSESSMENT OF 2001 TRAFFIC VOLUME FORECASTS - APRIL 24, 1980
2. FUNCTIONAL PLANNING: IDENTIFICATION OF AREAS OF CONCERN - APRIL 24, 1980
3. TRAFFIC ANALYSIS, EAST - WEST ARTERIAL - JUNE 5, 1980
4. FLOODPLAIN AND DRAINAGE ANALYSIS - JUNE 5, 1980
5. RECREATION MASTER PLAN - JUNE 5, 1980
6. NATURAL ENVIRONMENT AND RECREATION MASTER PLAN REPORT - NOVEMBER 28, 1980
7. ARCHAEOLOGICAL SURVEY AND HERITAGE RESOURCE ASSESSMENT - JUNE 1980
8. GEOTECHNICAL REPORT: PHASE 4 - MAY 30, 1980
9. GEOTECHNICAL INVESTIGATION, ESCARPMENT CROSSING - NOVEMBER 27, 1980
10. NOISE IMPACT ASSESSMENT - OCTOBER 1980
11. DRAFT REPORT: PHASE 4 - DECEMBER 1980

Appendix B - Exhibits

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

KEY PLAN

DeLCan

EXHIBIT 3

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

PROJECTED 2001
TRAFFIC VOLUMES

DeLCan

MOUNTAIN EAST-WEST and NORTH-SOUTH
CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA. 10+000 To STA. 11+150

DeLCan

EXHIBIT 6

SERVICE ROAD

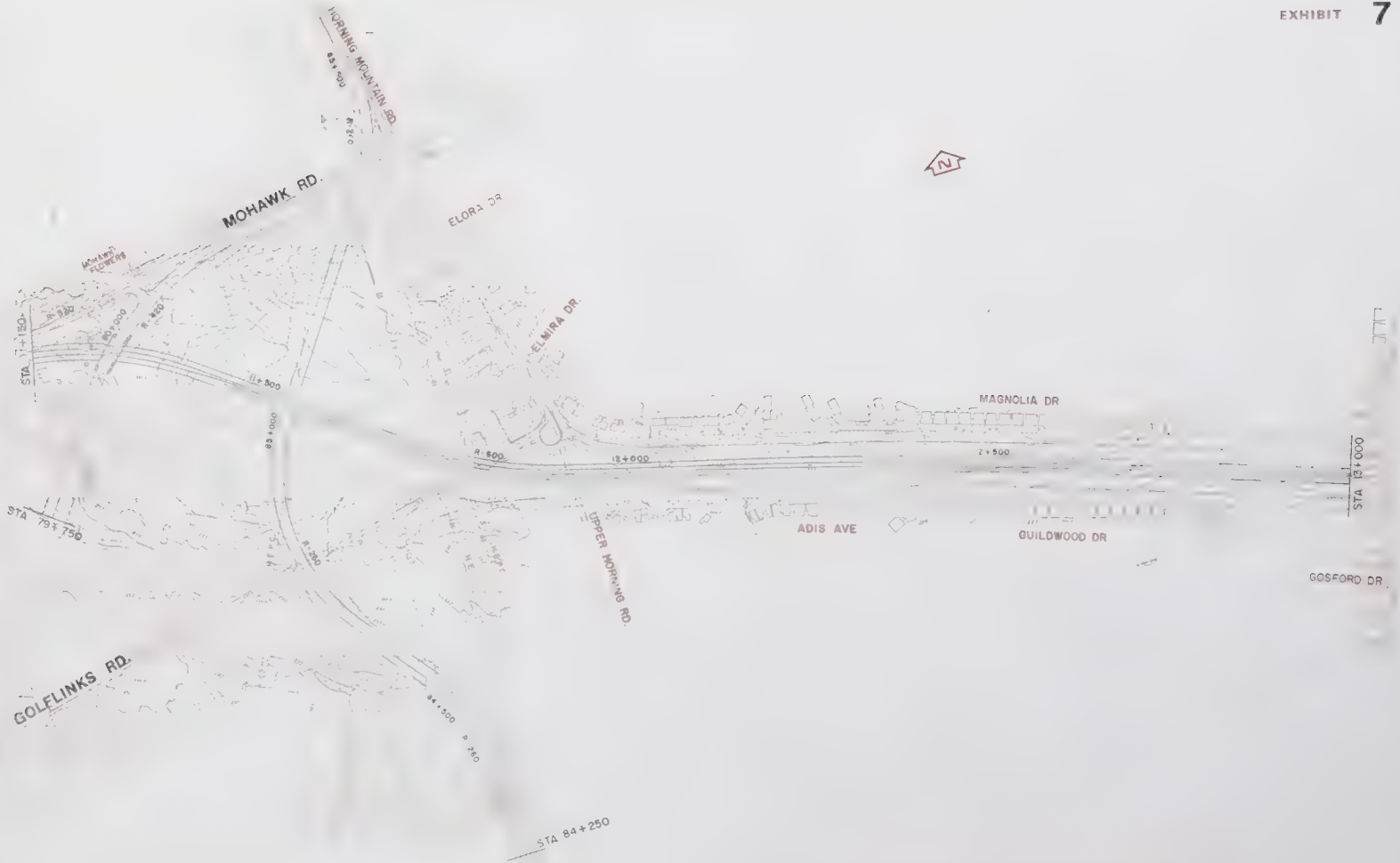
MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MOUNTAIN EAST - WEST ARTERIAL

STA. 10 + 000 To STA. 11 + 150

DeLCan

EXHIBIT 7



MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MOUNTAIN EAST - WEST ARTERIAL

STA. 11 + 150 To STA. 13 + 000

DeLCan

HORIZONTAL

VERTICAL

DeLCan

MOUNTAIN EAST-WEST and NORTH-SOUTH CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA 11+150 To STA. 13+000

UPPER PARADISE RD.

GARTH ST.

0 40 80 120 160 200
HORIZONTAL

0 4 8 12 16 20
VERTICAL

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

MOUNTAIN EAST - WEST ARTERIAL

STA. 13 + 000 To STA. 14 + 800

DeLCan

MOUNTAIN EAST - WEST and NORTH - SOUTH CORRIDOR STUDY

MOUNTAIN EAST - WEST ARTERIAL

STA. 14 + 800 To STA. 16 + 650

DeLCan

UPPER WENTWORTH ST.

UPPER SHERMAN AVE.

0 40 80 120 160 200
HORIZONTAL

0 4 8 12 16 20
VERTICAL

MOUNTAIN EAST-WEST and NORTH-SOUTH
CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA. 16+650 To STA. 18+400

DeLCan

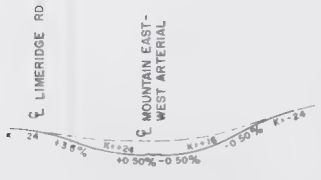
40 80 120 160 200
Scale 1 5000

MOUNTAIN EAST-WEST and NORTH-SOUTH
CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA. 18 + 400 To STA. 20 + 250

DeLCan



UPPER GAGE AVE.

UPPER OTTAWA ST.

MOUNTAIN EAST-WEST and NORTH-SOUTH
CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA. 18+400 To STA. 20+250

DeLCan

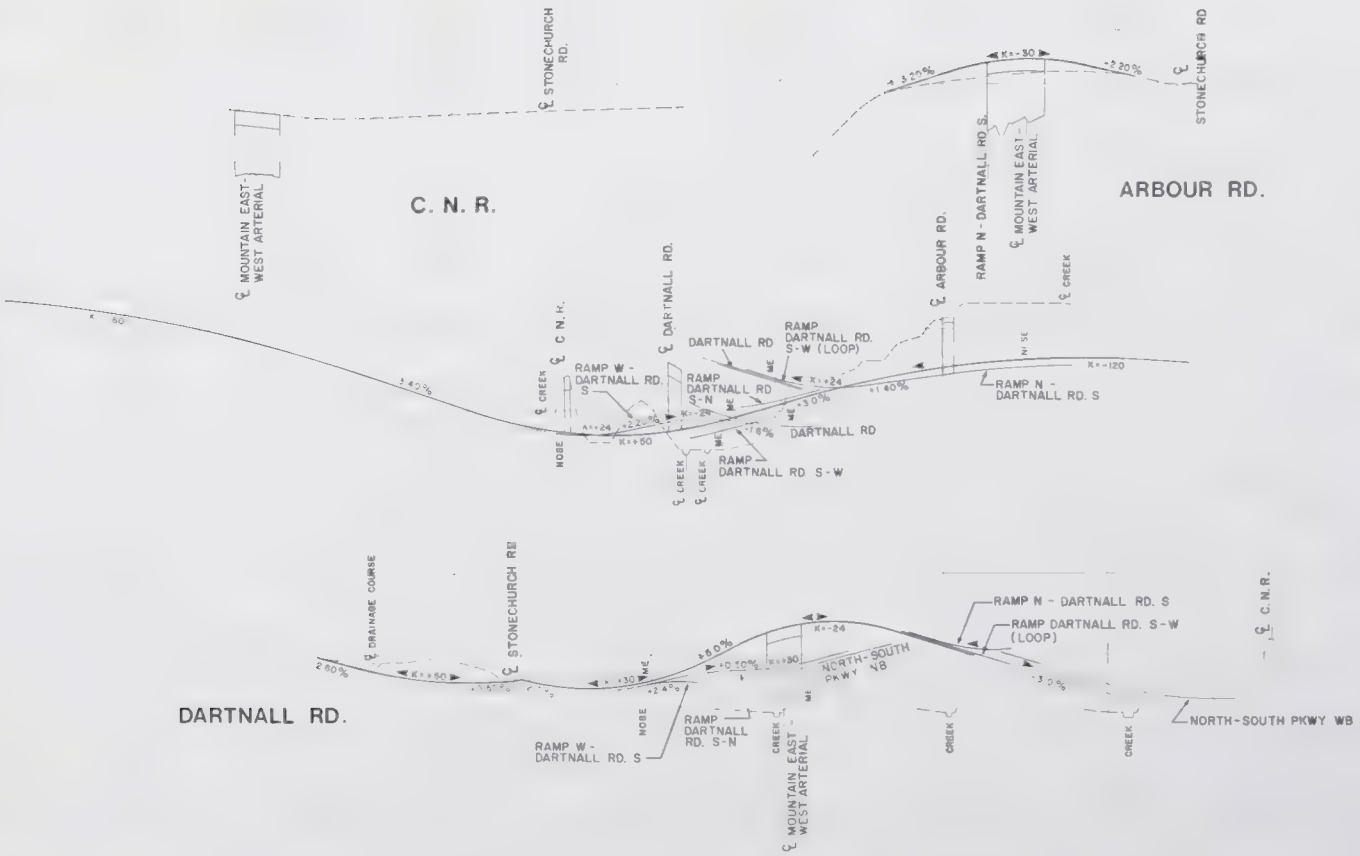
EXHIBIT 14

MOUNTAIN EAST-WEST and NORTH-SOUTH
CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA. 20 + 250 To STA. 21 + 700

DeLCan



0 40 80 120 160 200

0 4 8 12 16 20

MOUNTAIN EAST-WEST and NORTH-SOUTH CORRIDOR STUDY

MOUNTAIN EAST-WEST ARTERIAL

STA. 20+250 To STA. 21+700

DeLCan

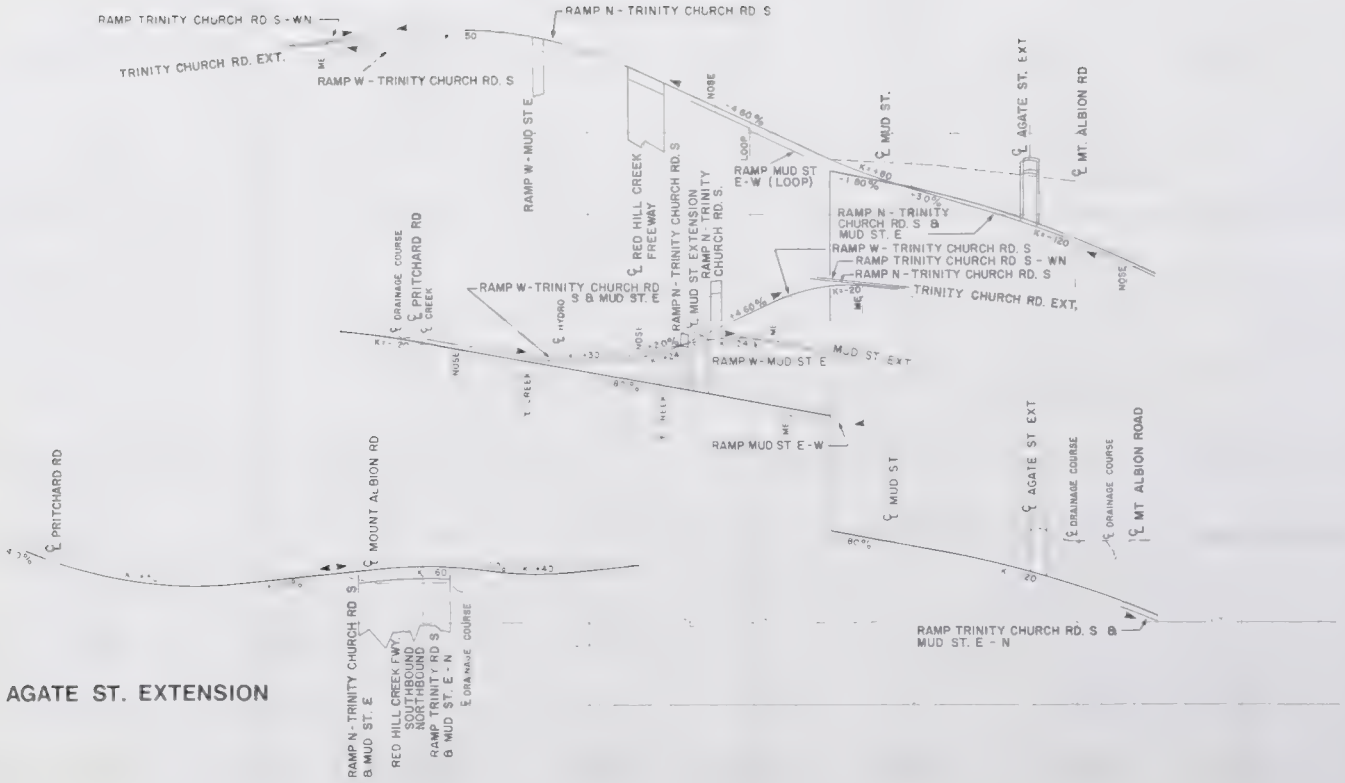
EXHIBIT 16

MOUNTAIN EAST - WEST and NORTH - SOUTH CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 21 + 700 To STA. 22 + 600

DeLCan


RAMP TRINITY CHURCH RD S - WN
TRINITY CHURCH RD. EXT.
RAMP W - TRINITY CHURCH RD. S
RAMP N - TRINITY CHURCH RD S
RAMP W - MUD ST E
RED HILL CREEK FREEWAY
RAMP N - TRINITY CHURCH RD. S
MUD ST EXTENSION
RAMP N - TRINITY CHURCH RD. S.
RAMP MUD ST E-W (LOOP)
MUD ST.
AGATE ST. EXT
MT. ALBION RD
RAMP N - TRINITY CHURCH RD. S & MUD ST. E
RAMP W - TRINITY CHURCH RD. S
RAMP TRINITY CHURCH RD. S - WN
RAMP N - TRINITY CHURCH RD. S
TRINITY CHURCH RD. EXT.
DRAINAGE COURSE
PRITCHARD RD
CREEK
RAMP W - TRINITY CHURCH RD & MUD ST. E
MUD ST EXT
RAMP MUD ST E-W
PRITCHARD RD
MOUNT ALBION RD
MUD ST
AGATE ST EXT
DRAINAGE COURSE
MT. ALBION ROAD
RAMP TRINITY CHURCH RD. S & MUD ST. E - N
RAMP N - TRINITY CHURCH RD S & MUD ST. E
RED HILL CREEK FWY.
SOUTHBOUND
NORTHBOUND
RAMP TRINITY RD S & MUD ST. E - N
DRAINAGE COURSE
HORIZONTAL
VERTICAL

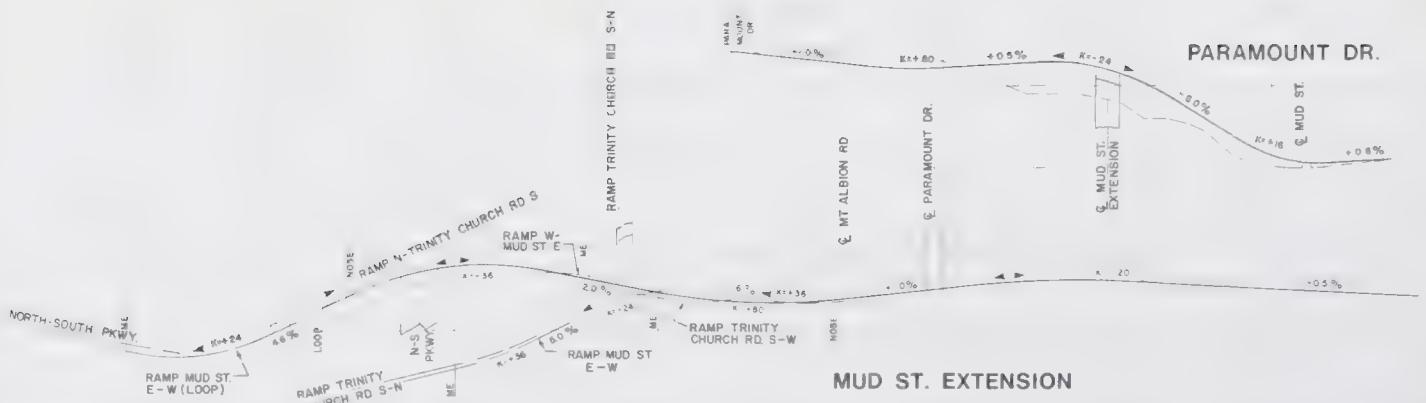
AGATE ST. EXTENSION

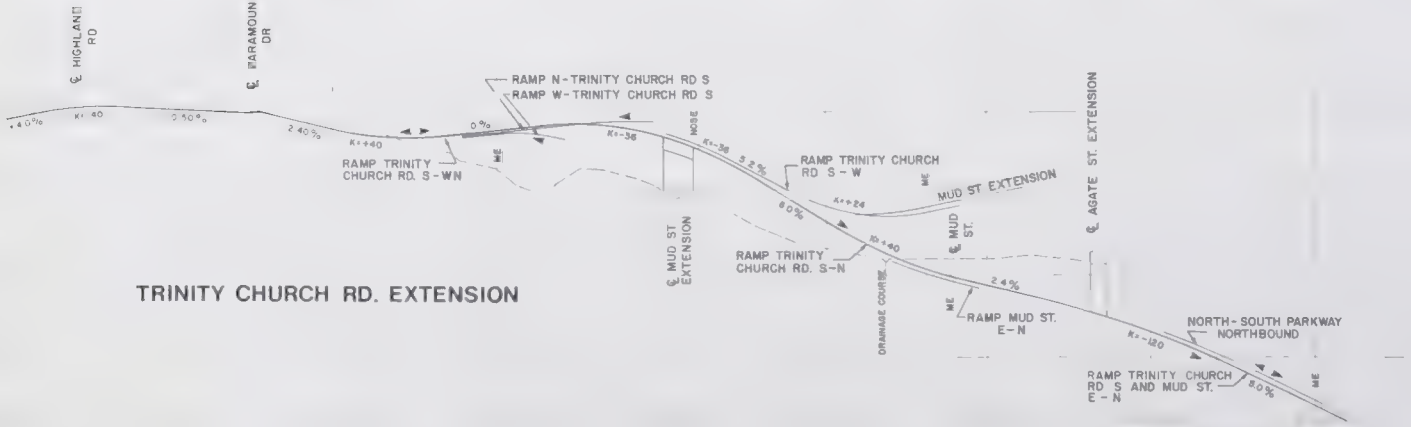
MOUNTAIN EAST - WEST and NORTH - SOUTH CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 21 + 700 To STA. 22 + 600

DeLCan




℄ HIGHLAND RD
℄ PARAMOUNT DR
RAMP N-TRINITY CHURCH RD S
RAMP W-TRINITY CHURCH RD S
RAMP TRINITY CHURCH RD. S-WN
RAMP TRINITY CHURCH RD S-W
MUD ST EXTENSION
℄ MUD ST EXTENSION
℄ MUD ST.
℄ AGATE ST. EXTENSION
RAMP TRINITY CHURCH RD. S-N
DRAINAGE COURSE
RAMP MUD ST. E-N
NORTH-SOUTH PARKWAY NORTHBOUND
RAMP TRINITY CHURCH RD S AND MUD ST. E-N
TRINITY CHURCH RD. EXTENSION

HORIZONTAL

VERTICAL

MOUNTAIN EAST-WEST and NORTH-SOUTH CORRIDOR STUDY

NORTH-SOUTH PARKWAY

STA. 45 + 600 / 50 + 800 To STA. 47 + 400 / 52 + 600

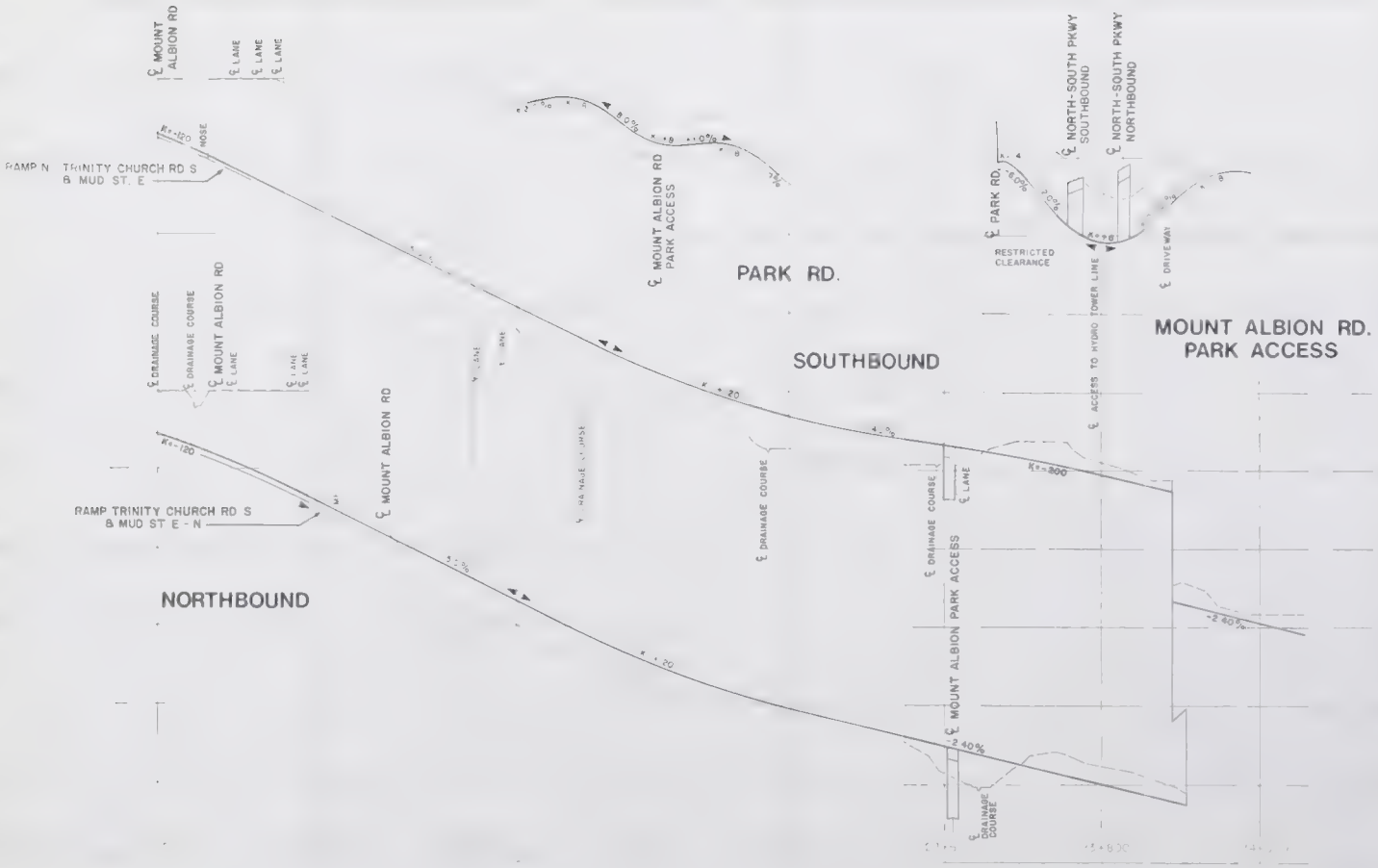
DeLCan

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 22 + 600 To STA. 24 + 100

DeLCan

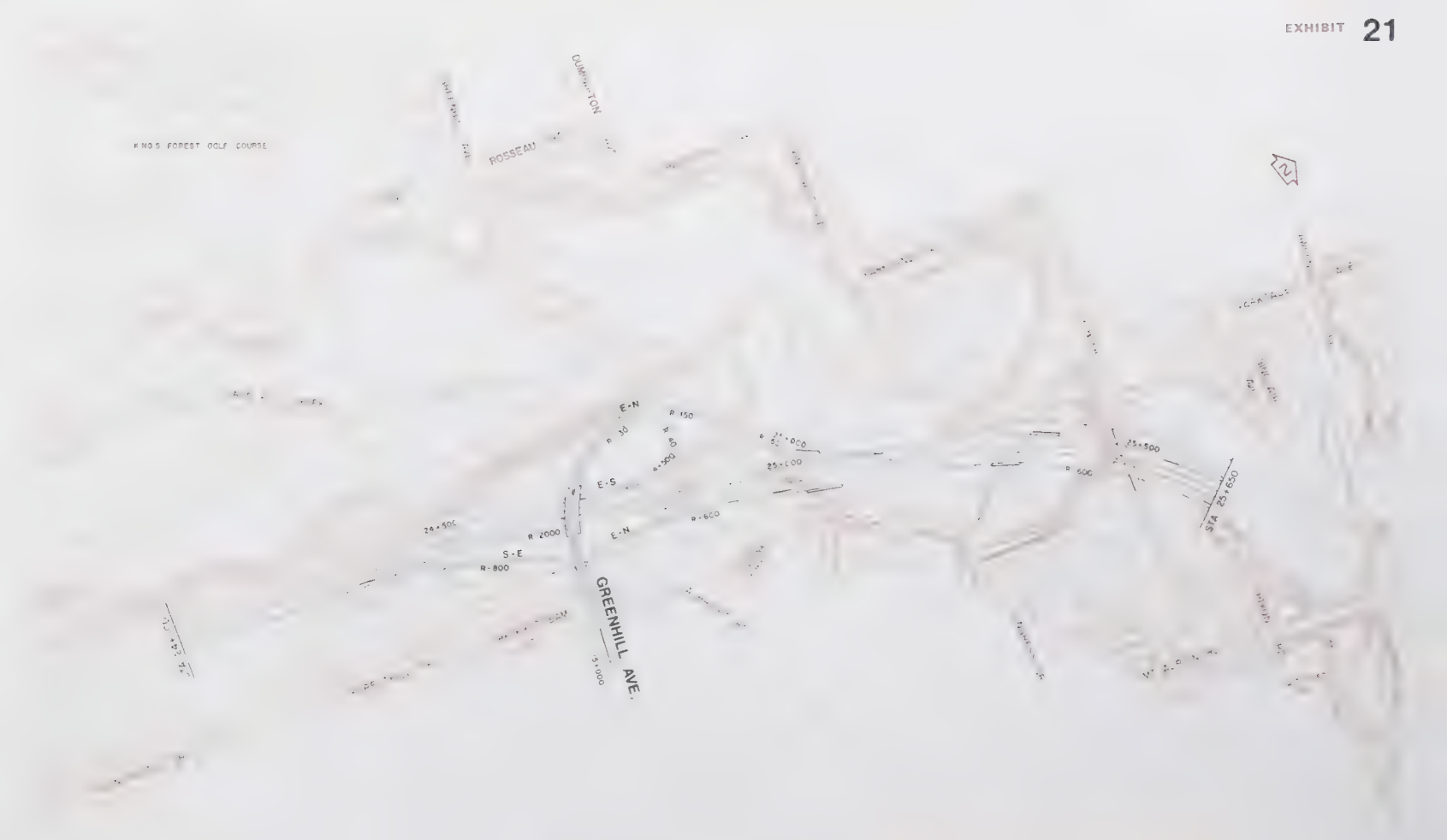


MOUNTAIN EAST - WEST and NORTH - SOUTH CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 22 + 600 To STA. 24 + 100

DeLCan



0 40 80 120 160 200

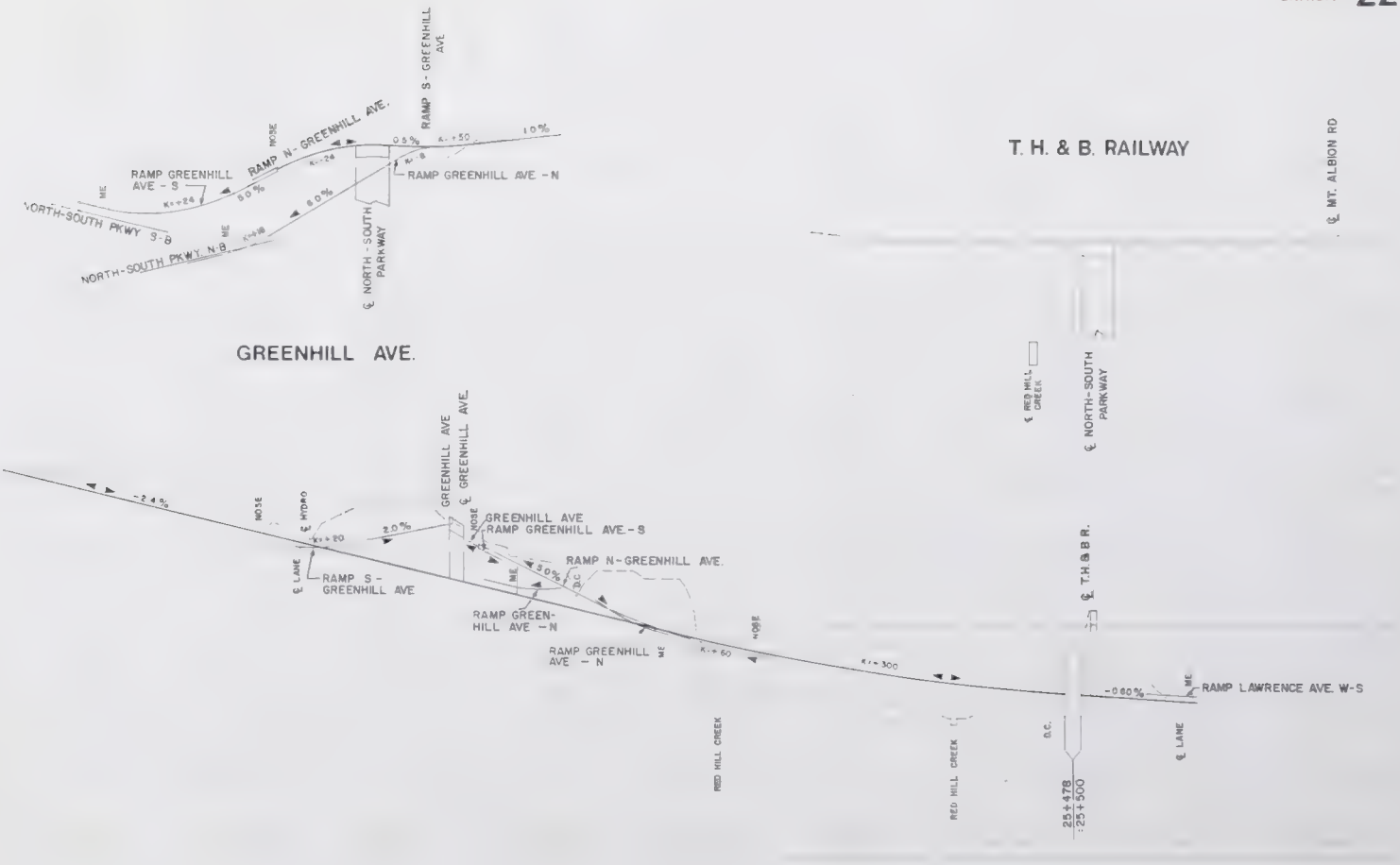
Scale

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 24 + 100 To STA. 25 + 650

DeLCan



MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 24 + 100 To STA. 25 + 650

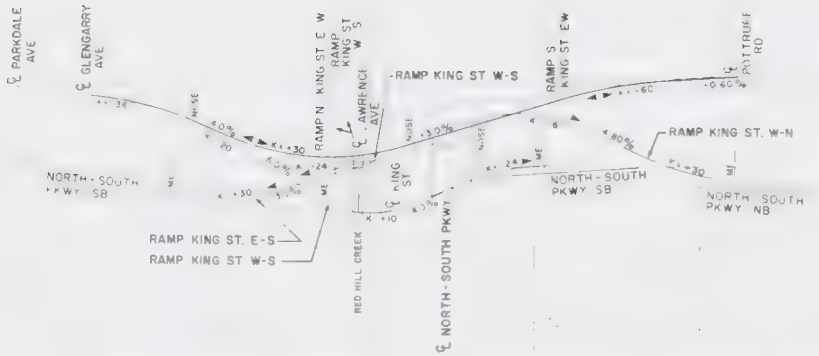
DotCan

MOUNTAIN EAST-WEST and NORTH-SOUTH
CORRIDOR STUDY

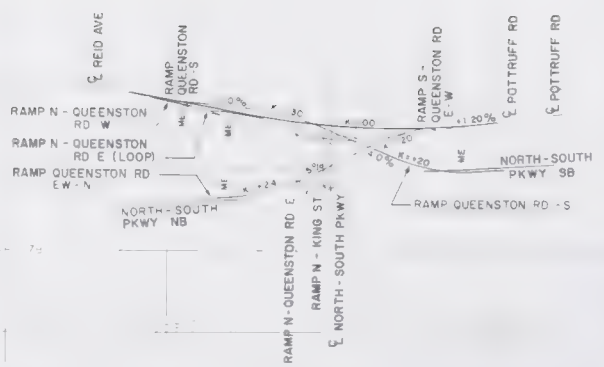
NORTH-SOUTH PARKWAY

STA. 25 + 650 To STA. 27 + 450

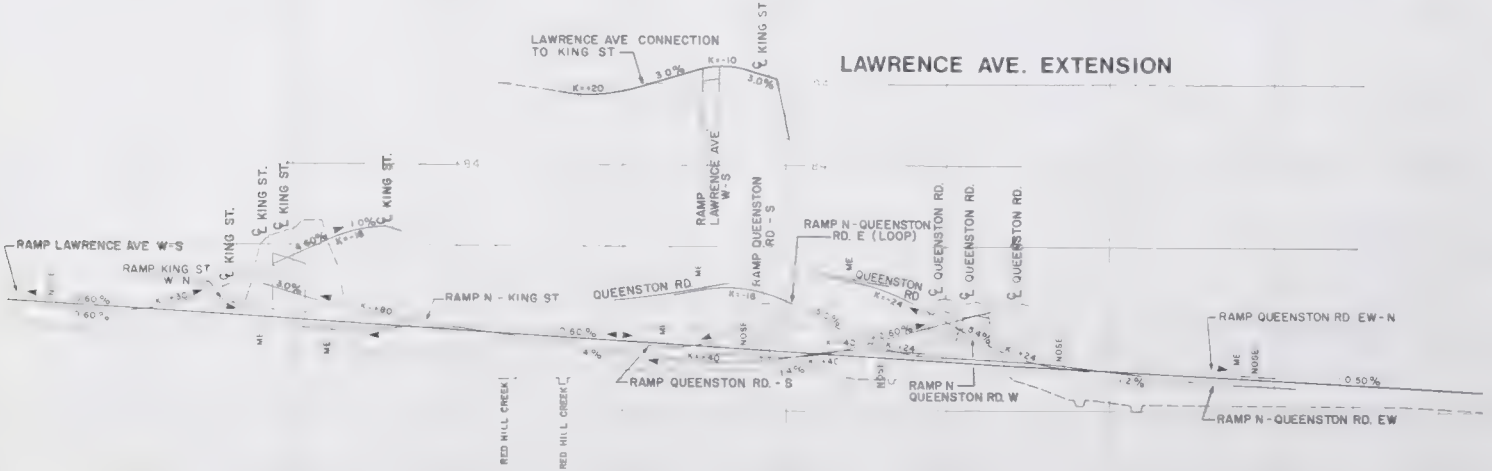
DeLCan


℄ PARKDALE AVE
℄ GLENGARRY AVE
RAMP N KING ST E W
RAMP KING ST W S
-RAMP KING ST W-S
RAMP S KING ST EW
℄ POTTRUFF RD
℄ LAWRENCE AVE
℄ KING ST
NORTH - SOUTH PKWY SB
RAMP KING ST. W-N
NORTH - SOUTH PKWY SB
NORTH - SOUTH PKWY NB
RAMP KING ST. E-S
RAMP KING ST W-S
RED HILL CREEK
℄ NORTH - SOUTH PKWY

KING ST. REALIGNMENT


℄ REID AVE
RAMP QUEENSTON RD - S
RAMP S - QUEENSTON RD E - W
℄ POTTRUFF RD
℄ POTTRUFF RD
RAMP N - QUEENSTON RD W
RAMP N - QUEENSTON RD E (LOOP)
RAMP QUEENSTON RD EW - N
NORTH - SOUTH PKWY NB
NORTH - SOUTH PKWY SB
RAMP QUEENSTON RD - S
RAMP N - QUEENSTON RD E
RAMP N - KING ST
℄ NORTH - SOUTH PKWY

QUEENSTON RD.


LAWRENCE AVE CONNECTION TO KING ST
℄ KING ST
LAWRENCE AVE. EXTENSION
RAMP LAWRENCE AVE W-S
RAMP KING ST W-N
℄ KING ST.
RAMP LAWRENCE AVE W-S
RAMP QUEENSTON RD - S
RAMP N - QUEENSTON RD. E (LOOP)
℄ QUEENSTON RD.
RAMP N - KING ST
QUEENSTON RD
RAMP QUEENSTON RD EW - N
RAMP QUEENSTON RD. - S
RAMP N QUEENSTON RD W
RAMP N - QUEENSTON RD. EW
RED HILL CREEK

MOUNTAIN EAST - WEST and NORTH - SOUTH CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 25 + 650 To STA. 27 + 450

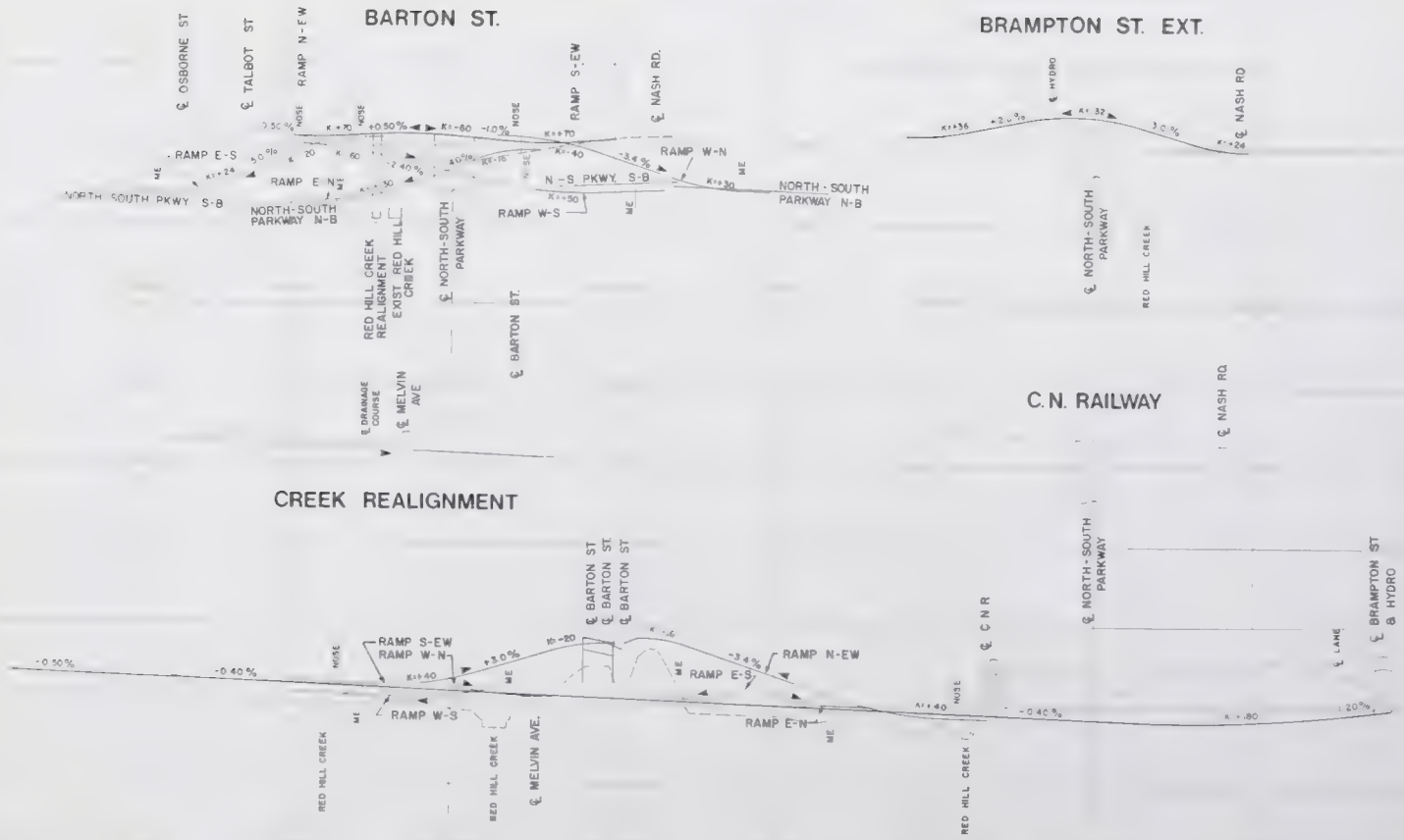
DeLCan

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

NORTH - SOUTH PARKWAY

STA. 27 + 450 To STA. 29 + 175

DeLCan



MOUNTAIN EAST-WEST and NORTH-SOUTH CORRIDOR STUDY

NORTH-SOUTH PARKWAY

STA. 27+450 To STA. 29+175

DeLCan

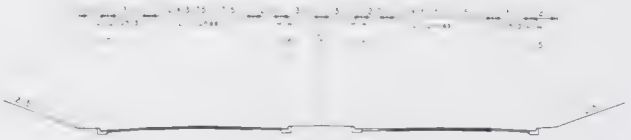
MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

NORTH - SOUTH PARKWAY

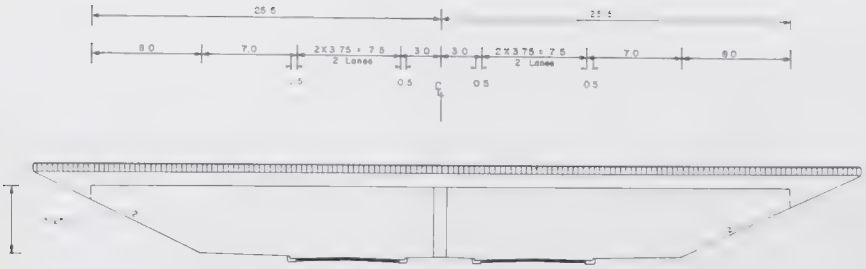
STA. 98 + 350 To STA. 100 + 000

DeLCan

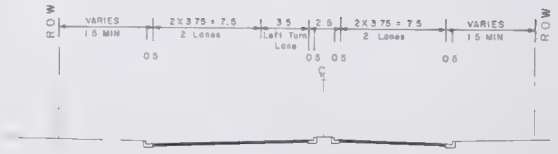
URBAN ARTERIAL DIVIDED



U.A.D. CONVERSION TO URBAN FREEWAY DIVIDED



URBAN ARTERIAL STRUCTURE



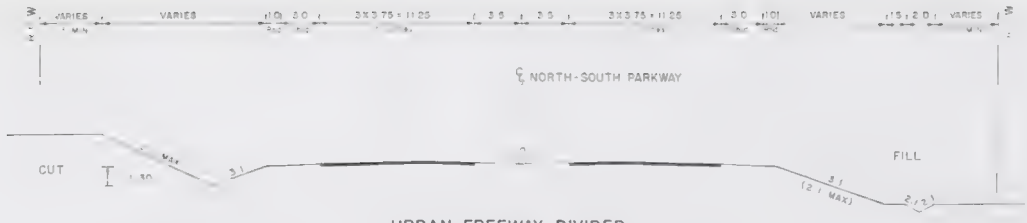
CROSS STREET

CROSS STREET STRUCTURE

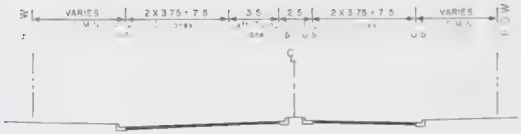
TYPICAL CROSS-SECTIONS

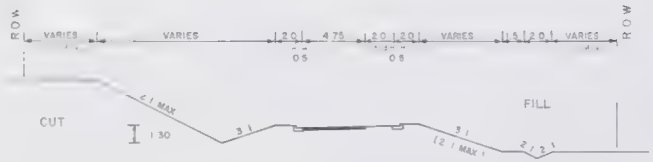
EAST-WEST

DeLCan



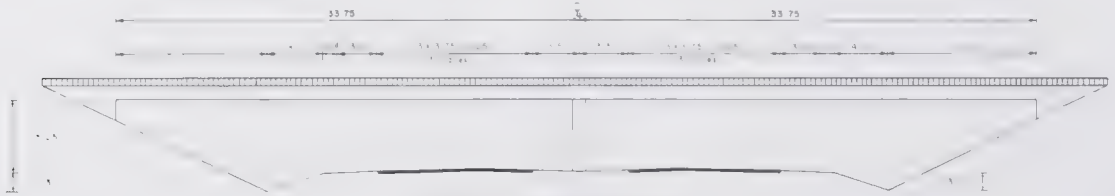
URBAN FREEWAY DIVIDED





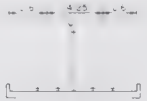
CROSS STREET

RAMP

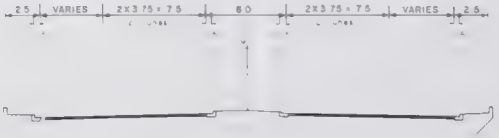


URBAN FREEWAY DIVIDED

CROSS STREET STRUCTURE



RAILWAY



CROSS STREET STRUCTURE DIVIDED

TYPICAL CROSS-SECTIONS
NORTH-SOUTH

DeLCan

MOUNTAIN EAST - WEST and NORTH - SOUTH
CORRIDOR STUDY

CONSTRUCTION STAGING

DeLCan

MOUNTAIN EAST - WEST AND NORTH - SOUTH CORRIDOR STUDY

PHASE 4: DETAILING OF PREFERRED OPTION

PUBLIC INFORMATION CENTRE QUESTIONNAIRE

MONDAY, JUNE 23	☐	ROXBOROUGH PARK SCHOOL
TUESDAY, JUNE 24	☐	ALBION PUBLIC SCHOOL
WEDNESDAY, JUNE 25	☐	MOUNT ALBION SCHOOL
THURSDAY, JUNE 26	☐	HILL PARK SECONDARY SCHOOL

1. DURING THE DETAILED PLANNING OF THE SELECTED ROADWAY ALTERNATIVE, EFFORTS HAVE BEEN MADE TO MINIMIZE THE IMPACT OF THE ROADWAY ON THE ABUTTING RESIDENTIAL, COMMERCIAL, AND OPEN SPACE DEVELOPMENT. DO YOU HAVE ANY COMMENTS REGARDING THE PROPOSAL?

2. IN MAKING THESE SUGGESTIONS, WHICH OF THE FOLLOWING ISSUES WERE MOST IMPORTANT TO YOU?

- ACCESS TO YOUR HOME AND WORK ☐
- PROPERTY REQUIREMENTS ☐
- TRAFFIC NOISE ☐
- VISUAL APPEARANCE ☐
- PEDESTRIAN CIRCULATION ☐
- EFFECT ON POTENTIAL RECREATIONAL LAND ☐
- PROXIMITY TO SCHOOLS ☐
- EFFECT ON VEGETATION AND WILDLIFE ☐
- OTHER (PLEASE DESCRIBE) ☐

3. THE RECREATIONAL MASTER PLAN HAS OUTLINED THE POSSIBLE RECREATIONAL DEVELOPMENT WITHIN THE RED HILL CREEK VALLEY COMPATIBLE WITH THE CONSTRUCTION OF A ROADWAY. DO YOU CONSIDER THE PROPOSED PLAN TO BE GENERALLY:

- GOOD ☐
- ACCEPTABLE ☐
- UNACCEPTABLE ☐

HOW COULD IT BE IMPROVED?

4. WHAT ISSUES DO YOU FEEL SHOULD BE INVESTIGATED FURTHER?

5. OTHER COMMENTS:

PLEASE LEAVE YOUR COMPLETED QUESTIONNAIRE WITH THE PROJECT STAFF BEFORE LEAVING THE INFORMATION CENTRE OR MAIL TO:

REGIONAL ENGINEERING DEPARTMENT,
CITY HALL,
ATTENTION: CORRIDOR STUDY,
71 MAIN STREET WEST, HAMILTON, ONTARIO, L8N 3T4.

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